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PRECAUTIONS AGAINST CHOLERA.

On account of the existing prevalence of cholera in many localities in Asia, steerage passengers from all ports of China and Japan are being examined upon arrival at United States ports by officers of the Public Health Service for the detection of possible cholera carriers. This is done pursuant to the amendment of the quarantine regulations promulgated July 19, 1911, reading as follows:

All steerage passengers arriving at ports in the United States from ports or places infected with cholera shall be subjected to bacteriological examination and shall not be admitted to entry until it has been determined by said examination that they are not cholera bacillus carriers.

PLAGUE, A DISEASE OF RODENTS.

How plague may be present in rats without making its appearance in man is well illustrated by the experience of the steamship *City of Durham*. The history of this vessel emphasizes what students of the subject know must be true, namely, that throughout the world there are many ports infected with plague in which the presence of the disease is not known because human cases have either not developed at all or not in sufficient numbers to attract attention. Such ports in turn undoubtedly serve as foci from which the infection is carried by rats to ships and thus to other ports.

The steamship *City of Durham* arrived at Hongkong August 23, 1916, without cargo, from Shanghai, China, and proceeded at once alongside of a concrete rat-proof wharf. Immediately upon arrival the ship was fumigated with 4 per cent sulphur dioxide. After the fumigation six dead rats were found. Examination of these rats showed that two of them were plague infected. The crew of 66 men were immediately examined and none found sick. The captain stated that no case of human plague had ever occurred aboard his ship.

This steamship is engaged in a general freight trade between New York, Boston, Philadelphia, and ports in the Far East, including Calcutta, Bombay, Rangoon, Vladivostok, Japan ports, Shanghai,

Hongkong, and others. On her last voyage the ship left New York June 17, 1916, calling at Colon, Canal Zone; San Francisco, Muroran, Vladivostok, Shanghai, and Hongkong in the order named. The master of the ship stated that while en route between Colon and San Francisco a member of the crew died of "internal trouble" June 29 and was buried at sea. On previous voyages the ship had been alongside the wharves at Calcutta and Rangoon, but whenever tied to a wharf standard rat guards had always been used on all lines. It was further stated that rats had very seldom been seen on the ship and the master had never heard of sick or dead rats being found on the vessel.

POLIOMYELITIS (INFANTILE PARALYSIS).

THE STATUS OF THE DISEASE IN NEW YORK CITY AND SURROUNDING TERRITORY.

By C. H. LAVINDER, Surgeon, United States Public Health Service.

The following brief notes are in continuation of previous reports. The statements made, however, are all provisional. Until the epidemic terminates, it will be impossible to make final statements or to form definite conclusions. It may be added that ultimately the statistical data supplied herewith and in previous reports, will doubtless need some small corrections.

In my last report (dated Aug. 26, 1916) I stated that a study of the weekly report of the cases in Greater New York seemed to indicate definitely that the epidemic was declining. This has proven true, as reference to Table 1 will show. This table gives the figures up to and including September 30, 1916, and it will be noticed that the total weekly reports have now dropped to less than 200 cases, as against a total of 1,210 cases for the week ended August 12, when the epidemic reached its crest in New York City. The figures continue to show a steady decline, and at the present rate of decrease, it would seem likely that by or before the middle of November, poliomyelitis in New York City will have reached about its normal endemic prevalence.

If the figures for the various boroughs are examined by weeks, it will be noticed also that each of these has shown a steady decline. The epidemic, however, did not begin in the various boroughs simultaneously and its march in them has not been entirely uniform. The borough of Richmond, which is the smallest, began early, and the epidemic in that borough seems to have definitely terminated some time ago. This borough up to quite recently showed the highest incidence rate in Greater New York. Quite recently, however, the borough of Queens, where the epidemic, though declining, still exists, has surpassed the borough of Richmond in incidence rate. The highest incidence rate in any of the boroughs has been between

three and four per thousand population. We have records of some limited areas outside of Greater New York, where the incidence rate has been as high as 10 per thousand or 1 per cent of the population. Wickman in his studies has reported incidence rates as high as 10 per cent, but we have seen nothing approaching this. The other boroughs in the city, as stated, have not declined with uniformity, but a steady decline is quite evident for them all.

The case fatality rate of the epidemic has been high, and shows some increase over my last report. At that date, it was a little over 23 per cent. It is now a little over 25 per cent.

The case fatality rate, however, from such data as are available, appears not to have been uniform throughout the city. In the Borough of Richmond, for example, it has been something less than 20 per cent, and I am credibly informed that in the hospitals of this city, where a great many cases have been treated, the case fatality rate has, for many of them, been something like 11 per cent. These apparently striking contrasts, however, must be accepted at present with great reservation, since not only are the data as yet incomplete, but these statements, in all probability, involve some fallacies which would be apparent in the presence of a full report. General statements of the above character must now be accepted with great caution.

The epidemic of poliomyelitis outside of New York, but in the surrounding States, is in reality an essential part of the New York City epidemic. It is therefore of interest to give some data regarding the prevalence of poliomyelitis in this area. In Table 2 are given the cases by weeks for the States of New York, New Jersey, Connecticut, Massachusetts, and Rhode Island, from all of which we have fairly accurate reports. The State of Pennsylvania is not included, as it should be, for the reason that no data at present are available to me.

TABLE 1.—*Poliomyelitis—Cases and deaths—Greater New York and boroughs.*¹

	Cases.						Total deaths for the city. ²
	Total for the city.	Brooklyn.	Manhattan.	Richmond.	Queens.	Bronx.	
Week ended—							
Sept. 2.....	477	144	210	7	64	53	151
Sept. 9.....	351	79	163	6	41	62	132
Sept. 16.....	254	58	114	2	38	42	84
Sept. 23.....	160	45	69	1	20	25	58
Sept. 30.....	144	30	57	1	22	34	53

¹ Continuation of table 1, published in Public Health Reports Sept. 8, 1916, p. 2409.

² Deaths by boroughs not now available.

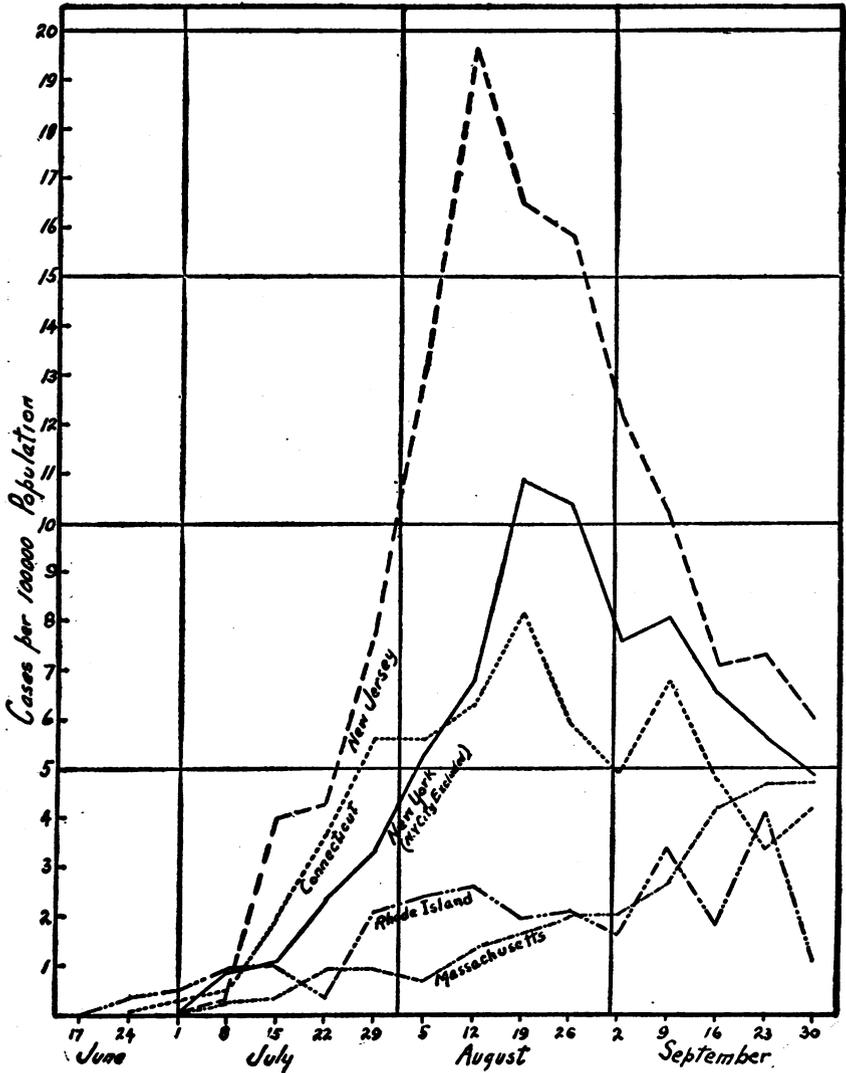
TABLE 2.—Cases of poliomyelitis by weeks.

1916, population.....	5,602,800	4,670,575	2,948,017	1,244,479	3,719,156	614,315
Week ending—	New York City.	New York State (exclusive of New York City).	New Jersey.	Connecticut.	Massachusetts.	Rhode Island.
1916.						
June 3.....	2					
June 10.....	11				2	
June 17.....	15				6	
June 24.....	97	3	2		1	2
July 1.....	279	11	2	2	0	3
July 8.....	557	41	9	6	10	5
July 15.....	979	54	119	24	13	6
July 22.....	795	113	127	45	33	2
July 29.....	962	156	231	68	32	13
Aug. 5.....	1,162	219	386	69	25	15
Aug. 12.....	1,210	319	582	78	49	16
Aug. 19.....	912	509	486	100	61	12
Aug. 26.....	743	484	468	72	74	13
Sept. 2.....	477	357	358	60	77	8
Sept. 9.....	351	389	300	83	101	18
Sept. 16.....	254	305	209	59	155	11
Sept. 23.....	160	248	216	42	175	26
Sept. 30.....	144	230	176	52	174	7
Total.....	9,100	3,468	3,671	760	988	157

An examination of the figures in this table shows not only the wide prevalence of this disease, but also gives some further indications which are very much more evident when one examines chronological spot maps of the same area. All of these States, except Massachusetts have passed the crest of the epidemic some time ago. Massachusetts, however, seems not yet to have reached the crest, and it is quite evident that the epidemic in that State developed later than in the States nearer to the City of New York. It is also evident that the State of Rhode Island has proportionately had less cases than the other States of this area. A glance at the chart transmitted herewith (prepared by Epidemiologist A. W. Freeman) showing weekly incidence rates for these States, confirms this. This chart also shows that the incidence rate in New Jersey has been very high.

So far as the chronological relations of the epidemics in these States are concerned, when compared with that of New York City, nothing striking can be observed. They all began approximately at the same time. Massachusetts, however, while showing early cases, did not develop epidemic prevalence until much later than the rest.

Finally, it may be added that reports show quite a general prevalence of poliomyelitis throughout the United States. Besides the epidemic in New York City and its surroundings, there seems to be, generally speaking, no large prevalence of the disease except in two States, Minnesota and Illinois, both of which have reported several hundred cases. So far as I can learn, the epidemics in these two States show



Poliomyelitis—Weekly incidence per 100,000 population for certain States, 1916.

the characteristics of the old type of poliomyelitis—that is, comparatively few cases widely scattered, with a low mortality. This is in striking contrast to the characteristics of the epidemic as it is occurring in New York City and the surrounding States.

A SICKNESS SURVEY OF NORTH CAROLINA.

By LEE K. FRANKEL, Ph. D., Sixth Vice President, and LOUIS I. DUBLIN, Ph. D., Statistician, Metropolitan Life Insurance Co., New York.

The following report gives the results of the third of a series of sickness surveys in typical American communities. The first two, covering Rochester, N. Y., and Trenton, N. J., were summarized in the United States Public Health Reports of February 25, 1916.¹

The State of North Carolina was chosen for this study and offered important advantages. In the first place, the State includes rural as well as urban communities, while the constitution of the populations previously surveyed was more homogeneous. An opportunity was likewise afforded to compare the amount of sickness in the white race with that of the colored.

The plan and the scope of the present inquiry are not materially different from those of the previous study. As before, the data were secured by the agents of the company. The reader is referred to the Rochester Survey, page 3, for the form used and the instructions given. The questions originally asked covered sex, age, occupation, disease, duration of sickness, medical attendance, and extent of disability. In addition to this information the North Carolina agents were requested to record the color of the families canvassed and also to furnish the name of the physician attending the case of illness.

It was hoped that in this way it would be possible to confirm subsequently the diagnoses stated to the agents by families in which sickness occurred. The instructions to agents were carefully carried out, and have led to more complete returns than were possible in the previous investigation.

Altogether 14,112 families were canvassed, containing 66,007 persons. Of these 43,468 were white and 22,539 were colored. While the sample was only about 2½ per cent of the total population of North Carolina, it constituted a very much larger proportion of the counties in which the canvass was made. It is confidently believed that the proportion was sufficiently large to enable us to accept the results as a fair index of the amount of sickness occurring in the sections can-

¹ Community Sickness Survey, Rochester, N. Y., September, 1915. Frankel, Lee K., and Dublin, Louis I., Public Health Reports. U. S. Public Health Service, Washington. February 25, 1916. Pp. 423-438. (Also as Public Health Reprint 326.)

vassed, if not in the State as a whole. The following table gives the major results of the survey:

TABLE 1.—Total number of persons canvassed, number and rate of sick persons, by region and district; North Carolina, April, 1916.

Region.	Persons canvassed.	Sick persons.	
		Number.	Rate per 1,000 exposed.
Total State.....	66,007	1,881	28.5
Mountain counties.....	2,911	109	37.4
Asheville District.....	2,911	109	37.4
Middle upland counties.....	46,942	1,344	28.6
Charlotte District.....	8,274	224	27.1
Greensboro District.....	14,238	308	21.6
Salisbury District.....	5,936	194	32.7
Raleigh District.....	18,491	618	33.4
Coast counties.....	16,154	428	26.5
Pamlico (Washington) District.....	7,270	168	23.1
Wilmington District.....	8,884	260	29.3

There were 1,881 cases of illness among 66,007 persons canvassed, or a rate of 28.5 per 1,000 exposed at all ages. This means that nearly 3 per cent reported sick among the population reached. The figures compare unfavorably with those of Rochester, where the corresponding ratio was less than 2½ per cent. The lowest rate in the three groups of North Carolina districts occurred in the coast counties, which were reached from the districts of Pamlico and Wilmington. These counties showed a morbidity rate of only 26.5 per 1,000. The middle upland counties, which included the districts of Charlotte, Greensboro, Salisbury, and Raleigh, gave a slightly higher rate, 28.6; the bulk of the material was in this area. The mountain counties, which were reached from the Asheville district, showed by far the highest rate, 37.4 per 1,000.

The survey was made during the week of April 17, 1916. During this week the temperature in Raleigh, which may be taken as an index for the State, ranged from 49° to 86°; the barometric pressure varied slightly above and below an average of 29.54 inches Hg. and the rainfall was 0.09 inch. The week as a whole was a favorable one for weather conditions. It should be remembered, also, that the month of April in North Carolina is one of the most healthful of the year, showing next to September the least number of deaths. Together these two conditions would indicate that the rates obtained are minimal as a measure of the amount of sickness occurring at all seasons in this State or, at any rate, that they are less than the average which may be expected for the entire year.

Extent of Disability.

The instructions to agents in the previous community surveys called for the recording of illness under three heads:

(a) Persons who are up and about, but are unable to work because of sickness or accident.

(b) Persons who are confined to bed at home because of sickness or accident.

(c) Persons who are receiving treatment in hospitals or other institutions for the sick.

No provision was made for enumerating cases of sickness in which the patient was able to work. It was thought best not to introduce this item, lest it result in the recording of a large number of trivial illnesses, passing indispositions, imaginary diseases, etc. Yet in spite of this requirement, which was especially emphasized in the verbal instructions given, a considerable number of cases were reported where the sick were able to work. In the Rochester survey, for example, 8.8 per cent were so definitely specified; together with the 8.4 per cent whose ability to work was not specified, these constitute a total of 17.2 per cent. In the Trenton survey these two groups amounted to 22.8 per cent. In view of this fact and also because these illnesses, not involving disability, were in many cases ascribed to serious conditions, such as organic diseases of the heart, pulmonary tuberculosis, and Bright's disease, it seemed wise, in preparing for the North Carolina survey, not to give specific directions to exclude the cases of illness with ability to work. The instructions, however, again emphasized the importance of recording illnesses causing disability; it was these cases in which the survey was most interested. In spite of this fact the records show a condition almost identical with that of the two previous surveys; namely, that 10.2 per cent of the recorded illness stated specifically the ability to work, and 9.4 per cent in addition did not specify ability to work. Combining these two groups as before, we obtain 19.6 per cent, which we shall consider under the general head of "Able to work." It is realized that these cases are not as serious as the remainder, where the sick are specified under the required categories. The facts are given as returned, and if the reader is to make use of the material he should be mindful of its qualifications.

The following table presents the facts with reference to the extent of disability for the two sexes, first for both races and then for the two races separately:

TABLE 2.—*Sickness in North Carolina, week beginning Apr. 17, 1916, classified by extent of disability, by color, and by sex.*

Extent of disability; color.	Persons.		Males.		Females.	
	Number.	Per cent of total.	Number.	Per cent of total.	Number.	Per cent of total.
All persons, all classes.....	1,881	100.0	738	100.0	1,143	100.0
Unable to work.....	1,512	80.4	595	80.6	917	80.2
In bed at home.....	491	26.1	166	22.5	325	28.4
In bed in hospital.....	46	2.4	17	2.3	29	2.5
Up and about.....	975	51.8	412	55.8	563	49.3
Able to work.....	192	10.2	68	9.2	124	10.9
Ability to work not specified.....	177	9.4	75	10.2	102	8.9
White, all classes.....	1,243	100.0	510	100.0	733	100.0
Unable to work.....	983	79.1	405	79.4	578	78.8
In bed at home.....	319	25.7	105	21.2	211	28.8
In bed in hospital.....	33	2.6	12	2.3	21	2.8
Up and about.....	631	50.8	285	55.9	346	47.2
Able to work.....	138	11.1	55	10.8	83	11.4
Ability to work not specified.....	122	9.8	50	9.8	72	9.8
Colored, all classes.....	638	100.0	228	100.0	410	100.0
Unable to work.....	529	82.9	190	83.3	339	82.7
In bed at home.....	172	27.0	58	25.4	114	27.8
In bed in hospital.....	13	2.0	5	2.2	8	2.0
Up and about.....	344	53.9	127	55.7	217	52.9
Able to work.....	54	8.5	13	5.7	41	10.0
Ability to work not specified.....	55	8.6	25	11.0	30	7.3

Of the 1,881 cases of sickness, 1,512 or 80.4 per cent were unable to work. Under this head 28.5 per cent of the total were confined to bed and 51.8 per cent were up and about. The figures are very similar to those found in Rochester, where 27.6 per cent were confined to bed and 55.2 per cent were up and about. Only 2.4 per cent of all the cases were in hospitals. This contrasts strikingly with 10.7 per cent in Rochester and 14.4 per cent in Trenton and points perhaps to the limited hospital facilities of a large State which is for the most part rural in character.¹ No important distinctions in this respect appear in contrasting the two races or the two sexes.

Without distinction of color the two sexes show differences in the distribution of the figures as to character of disability, but these are not of great significance. Contrasting the facts for white and colored persons we find a larger proportion unable to work among the colored than among the white—82.9 per cent as against 79.1 per cent. It is curious that the figures for the colored rather than for the white of North Carolina approximate closely the figures for the preponderantly white population of Rochester.

¹ The United States Bureau of the Census report on benevolent institutions for the year 1910 registered 0.50 beds in hospitals and sanatoria per 1,000 of population in North Carolina. This figure may be compared with 3.93 per 1,000 per Trenton, N. J., and 4.32 per 1,000 per Rochester, N. Y., in the same year.

Sickness by Color, by Sex, and by Age Period.

We shall now examine the rates of sickness among white and colored persons in the two sexes and in the various age periods. The following table presents these data for white persons, indicating all cases of sickness including those involving inability to work.

TABLE 3.—*Number of cases, and rates per 1,000 exposed, among white persons by age and by sex—Total sick and sick unable to work.*

Sex, and age period.	Number of persons exposed.	Total sick persons.		Sick persons unable to work.	
		Number.	Rate per 1,000 exposed.	Number.	Rate per 1,000 exposed.
Males:					
All ages.....	20,340	510	25.1	405	19.9
Ages 15 and over.....	12,367	388	31.4	314	25.4
Under 15.....	7,973	122	15.3	61	11.4
15 to 24.....	4,238	67	15.8	57	13.4
25 to 34.....	3,143	71	22.6	55	17.5
35 to 44.....	2,135	60	28.1	49	23.0
45 to 54.....	1,473	63	42.8	49	33.3
55 to 64.....	1,013	71	70.1	55	54.3
65 and over.....	330	54	163.6	47	142.4
Unknown age.....	35	2	57.1	2	57.1
Females:					
All ages.....	22,468	733	32.6	578	25.7
Ages 15 and over.....	14,239	613	42.8	487	34.0
Under 15.....	8,129	120	14.8	91	11.2
15 to 24.....	5,248	131	24.8	103	19.5
25 to 34.....	3,546	130	36.7	103	29.0
35 to 44.....	2,398	132	55.0	100	41.7
45 to 54.....	1,718	101	58.8	82	47.7
55 to 64.....	1,013	76	75.0	64	63.2
65 and over.....	339	42	123.9	34	100.3
Unknown age.....	37	1	77.0	1	27.0
Unknown sex.....	660				

Without distinction of extent of disability, 25.1 white males and 32.6 white females were reported sick out of each thousand exposed. In Rochester the corresponding figures were only 21.4 and 24.8 respectively. Taking the figures for ages 15 and over, i. e., eliminating the children, for whom it is always difficult to obtain a precise statement of the facts of sickness, we have rates of 31.4 for males and 42.8 for females. These figures are likewise considerably higher than the corresponding figures for Rochester, i. e., 27.3 and 31.2 respectively.

Sickness involving disability, which is clearly the more important from an economic standpoint, occurred at the rate of 19.9 per thousand among males and 25.7 per thousand among females. Here again the differences are in favor of the population of Rochester, although these are not so marked as in the previous case, the corresponding figures for Rochester being 17.8 and 20.4 respectively. Eliminating the ages below 15, the population of North Carolina has 25.4 males and 34 females per thousand exposed who are so sick as to be unable to work. The latter figure is high, especially when contrasted with the rate for the city of Rochester, 25.4.

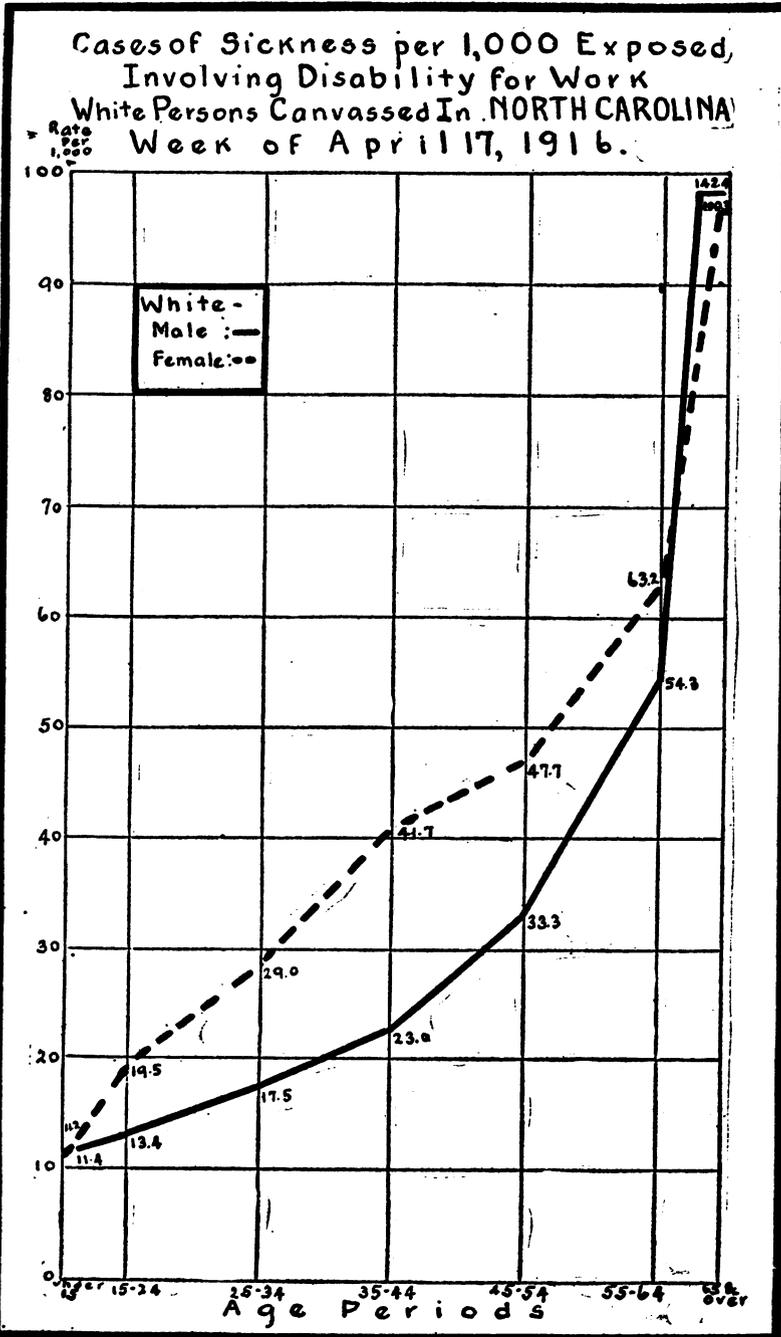
Graph 1 illustrates, for whites, the relation between age and the rate of sickness in each sex. It will be seen that from the first age class to the last the curve of morbidity rises uninterruptedly. Sickness with disability is slightly more prevalent among females than among males. From ages 15 to 64, however—that is, for the bulk of life—there is a marked excess of sickness among females. After 65 the rate is again higher among males. Attention should be directed to the regular character of the curve for the males. This is due in part to the large number of cases exposed and reflects also the care with which the data were collected by the enumerators. The curve for females is not quite so regular, but this fluctuation is generally found among females, where such disturbing elements as occupation and child-bearing affect the curve very definitely at certain age periods. A comparison of the curve with that of Rochester shows that the differences between the two sexes are much more striking in North Carolina.

The following table shows the corresponding facts for the colored population of North Carolina:

TABLE 4.—Number of cases, and rates per 1,000 exposed, among colored persons by age and by sex—Total sick and sick unable to work.

Sex and age period.	Number of persons exposed.	Total sick persons.		Sick persons unable to work.	
		Number.	Rate per 1,000 exposed.	Number.	Rate per 1,000 exposed.
Males:					
All ages.....	9,962	228	22.9	190	19.1
Ages 15 and over.....	6,428	186	28.9	158	24.6
Under 15.....	3,534	42	11.9	32	9.1
15 to 24.....	2,091	28	13.9	22	10.9
25 to 34.....	1,399	26	18.6	21	15.0
35 to 44.....	1,321	35	26.5	27	20.4
45 to 54.....	947	37	39.1	29	30.6
55 to 64.....	509	31	62.0	30	60.0
65 and over.....	210	27	128.6	27	128.6
Unknown age.....	30	2	66.7	2	66.7
Females:					
All ages.....	12,134	410	33.8	339	27.9
Ages 15 and over.....	8,331	381	45.7	315	37.8
Under 15.....	3,803	29	7.6	21	6.3
15 to 24.....	2,633	61	23.2	51	19.4
25 to 34.....	2,107	84	39.9	72	34.2
35 to 44.....	1,666	80	48.0	67	40.2
45 to 54.....	1,103	58	52.6	44	39.9
55 to 64.....	558	60	107.6	44	78.9
65 and over.....	220	35	159.1	34	154.5
Unknown age.....	41	3	68.2	3	68.2
Unknown sex.....	443				

Among the colored there were 22.9 males and 33.8 females reported sick per 1,000 exposed. For ages 15 and over the rates were 28.9 for males and 45.7 for females. The record of colored males is somewhat better than that of whites, while that of colored females is somewhat less favorable than that of white females.



Graph 1.

The same is true of the more significant form of morbidity, i. e., sickness involving disability to work. For all ages, colored males had a rate of 19.1 and colored females a rate of 27.9 from sickness incapacitating them for work. Eliminating the ages below 15, the figures were 24.6 for males and 37.8 for females.

Again, the curve for males is quite regular. With slight exceptions colored males show uniformly lower rates than white males for the corresponding ages. The curve for females shows an even greater accentuation of the characteristic irregularities that have already been referred to for white females. Of the four sex and color groups that have been considered, the colored females exhibit a rate which is lowest at the earlier ages and highest at the later ages. After the conclusion of the first age period, the rates for colored females are appreciably higher than for colored males, the differences being most marked in the child-bearing period of life.

The following table presents a comparison of the sickness involving disability, by race, without differentiation as to sex:

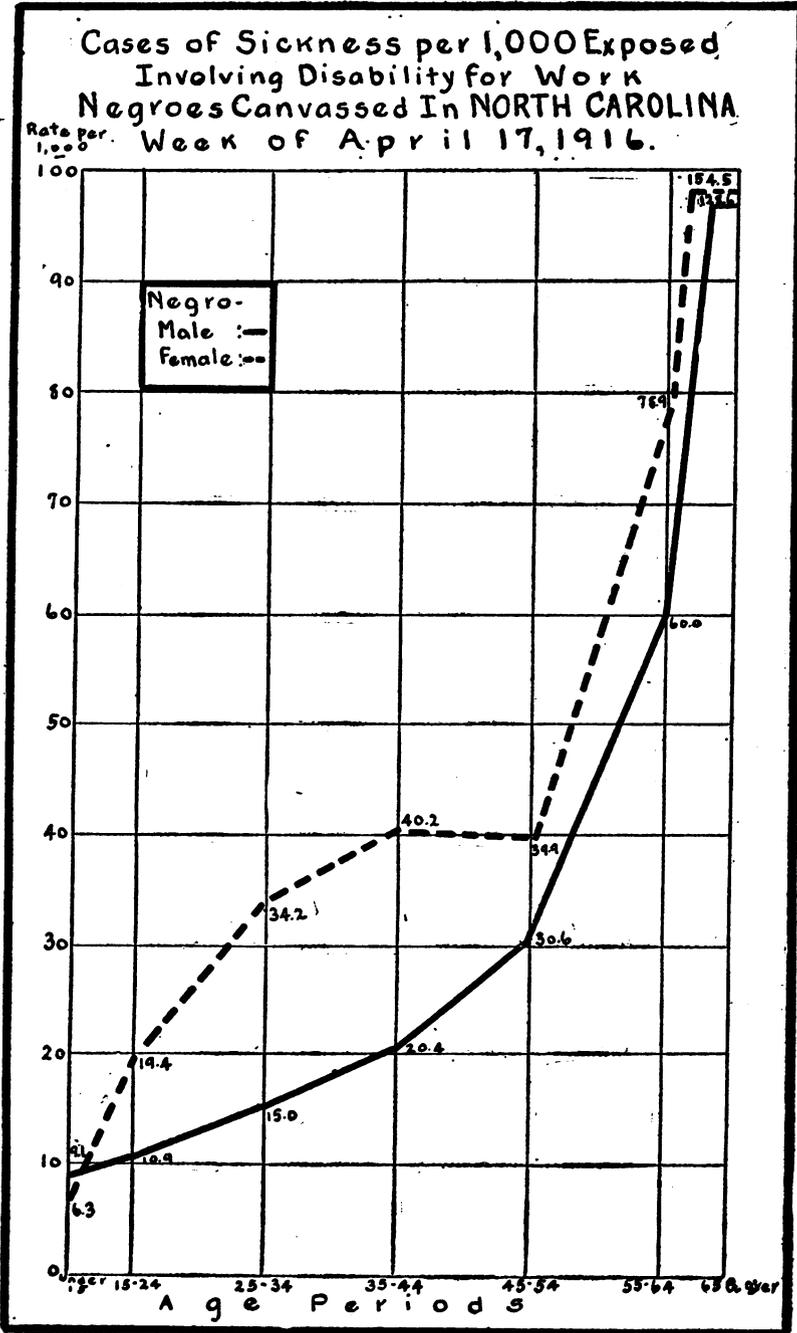
TABLE 5.—Number of cases and rates per 1,000 exposed, by age and by color—Sick persons unable to work.

Age period.	Whites.			Colored.		
	Number of persons exposed.	Total sick persons.		Number of persons exposed.	Total sick persons.	
		Number.	Rate per 1,000 exposed.		Number.	Rate per 1,000 exposed.
All ages.....	43,468	983	22.6	22,539	529	23.5
Ages 15 and over.....	27,316	801	29.3	15,197	473	31.1
Under 15.....	16,152	182	11.3	7,342	56	7.6
15 to 24.....	9,554	160	16.7	4,655	73	15.7
25 to 34.....	6,696	158	23.6	3,509	93	26.5
35 to 44.....	4,536	149	32.8	2,988	94	31.5
45 to 54.....	3,191	131	41.1	2,051	73	35.6
55 to 64.....	2,029	119	58.6	1,060	74	69.8
65 and over.....	669	81	121.1	430	61	141.9
Unkno. n age.....	641	3	4.7	501	5	9.9

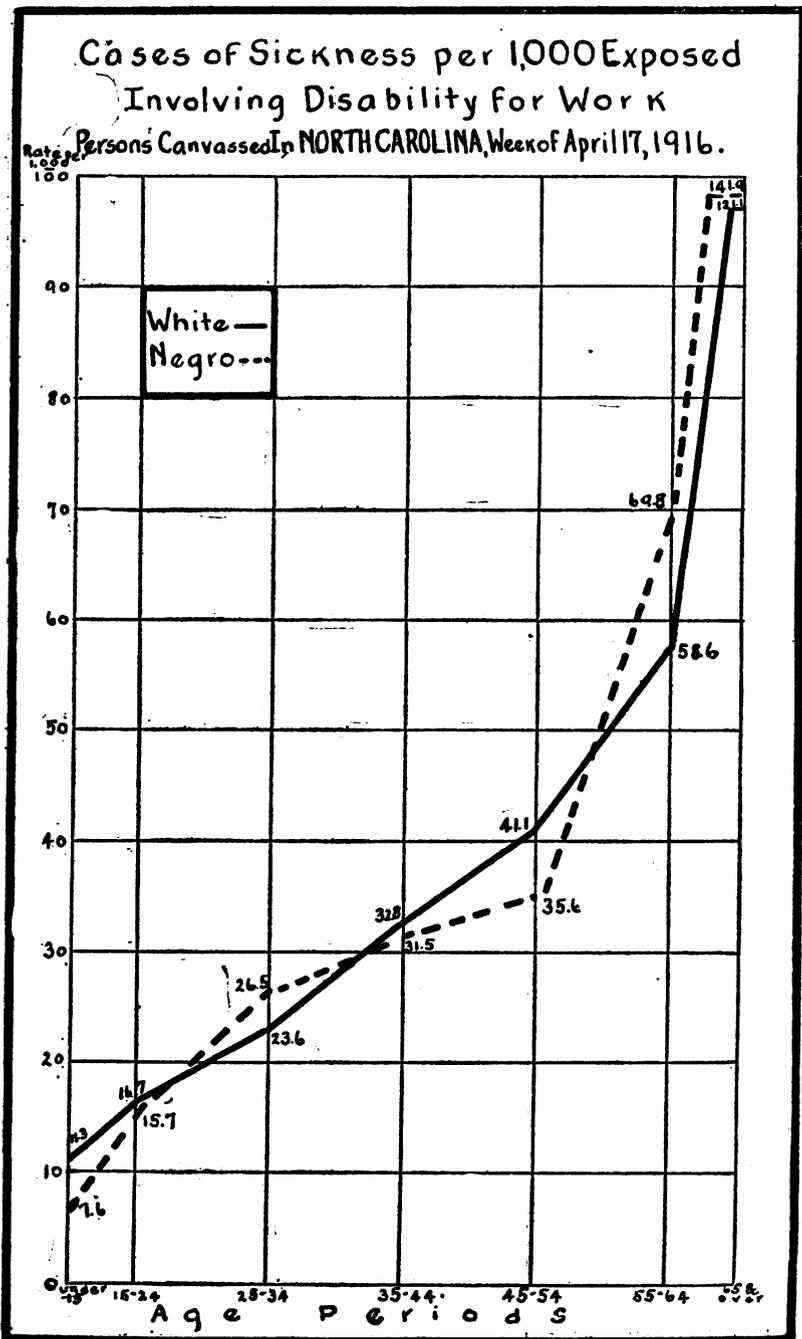
Graph 3 sets forth the curves constituted by the above figures.

Up to the conclusion of the age period 15 to 24 the whites have higher rates. At ages 25 to 34 the condition is reversed. In the two decades between ages 35 and 54 the colored rates are lower, but in the advanced ages that follow they are again higher. The rates for the two races, then, are decidedly at variance with each other; however, as a result of the irregularities of the colored female curve, the picture obtained is somewhat confused and exhibits no decided tendency.

The following table indicates the number in each race who were sick, with or without disability, for each of the more important diseases and conditions:



Graph 2.



Graph 3.

TABLE 6.—Sickness among 66,007 persons in North Carolina, week beginning Apr. 17, 1916, classified by disease or condition, by extent of disability, and by color.

Disease or condition.	All persons (66,007).						White (43,408).						Colored (22,599).					
	Persons sick and unable to work.			Persons sick but able to work.			Persons sick and unable to work.			Persons sick but able to work.			Persons sick and unable to work.			Persons sick but able to work.		
	Num-ber of cases.	Per cent total.	Cases per 100,000 ex-posed.	Num-ber of cases.	Per cent total.	Cases per 100,000 ex-posed.	Num-ber of cases.	Per cent total.	Cases per 100,000 ex-posed.	Num-ber of cases.	Per cent total.	Cases per 100,000 ex-posed.	Num-ber of cases.	Per cent total.	Cases per 100,000 ex-posed.	Num-ber of cases.	Per cent total.	Cases per 100,000 ex-posed.
All diseases and conditions	1,512	100.0	2,290.7	369	100.0	559.0	983	100.0	2,201.4	260	100.0	598.1	529	100.0	2,347.0	109	100.0	483.6
General diseases	567	37.5	859.0	129	35.0	195.5	394	39.9	906.2	95	36.7	218.5	173	32.9	767.6	34	31.0	150.8
Typhoid fever.....	20	1.3	30.3	9	2.4	13.6	14	1.4	32.2	7	2.7	16.1	6	1.1	26.6	2	1.8	8.9
Malaria.....	67	4.4	101.5	1	0.3	1.5	59	6.0	135.7	1	0.4	2.3	8	1.5	35.5	2	1.8	8.9
Smallpox.....	4	0.3	6.1	6	1.6	9.1	22	2.2	50.6	5	1.9	11.5	2	0.4	8.9	1	0.9	4.4
Diseases of the throat.....	24	1.6	36.4	1	0.3	1.5	1	0.1	2.3	2	0.8	4.6	2	0.4	8.9	1	0.9	4.4
Scarlet fever.....	1	0.1	1.5	2	0.5	3.0	1	0.1	2.3	2	0.8	4.6	2	0.4	8.9	1	0.9	4.4
Whooping cough.....	28	1.9	42.4	8	2.2	12.1	20	2.0	46.0	8	3.1	18.4	8	1.5	35.5	1	0.9	4.4
Diphtheria and croup.....	2	0.1	3.0	1	0.3	1.5	1	0.1	2.3	1	0.4	2.3	1	0.2	4.4	1	0.9	4.4
Influenza.....	125	8.3	189.4	25	6.8	37.9	69	7.0	158.7	18	6.9	41.4	56	10.6	248.5	7	6.4	31.1
Other epidemic diseases.....	18	1.2	27.3	5	1.4	7.6	13	1.3	29.9	4	1.5	9.2	5	1.0	22.2	1	0.9	4.4
Pellagra.....	24	1.6	36.4	15	4.1	22.7	22	2.2	50.6	14	5.4	32.2	2	0.4	8.9	1	0.9	4.4
Tuberculosis of the lungs.....	83	5.5	125.7	17	4.0	25.8	62	6.3	142.6	15	5.8	34.5	21	4.0	93.2	2	1.8	8.9
Other forms of tuberculosis.....	8	0.5	12.1	4	1.1	6.1	6	0.6	13.8	2	0.8	4.6	2	0.4	8.9	2	1.8	8.9
Cancer (all forms).....	8	0.5	12.1	2	0.5	3.0	4	0.4	9.2	1	0.4	2.3	4	0.8	17.7	1	0.9	4.4
Rheumatism (all forms).....	141	9.3	213.6	31	8.4	47.0	88	9.0	202.4	15	5.8	34.5	53	10.0	235.1	16	14.7	71.0
Other general diseases.....	14	0.9	21.2	4	1.1	6.1	11	1.1	25.3	3	1.2	6.9	3	0.6	13.3	1	0.9	4.4
Diseases of the nervous system and of organs of special sense	189	12.6	286.3	32	8.8	48.5	113	11.5	259.9	16	6.2	36.8	76	14.3	337.2	16	14.8	70.9
Cerebral hemorrhage, apoplexy, and paralysis.....	77	5.1	116.7	8	2.2	12.1	32	3.3	73.6	5	1.9	11.5	45	8.5	199.7	3	2.8	13.3
Mental alienation (insanity).....	16	1.1	24.2	10	2.8	15.1	10	1.0	23.0	5	1.9	11.5	6	1.1	26.6	3	2.8	13.3
Other diseases of the nervous system.....	86	5.7	130.3	19	5.2	28.8	67	6.8	154.1	10	3.9	23.0	19	3.6	84.3	9	8.3	39.9
Diseases of the eyes and their annexa.....	10	0.7	15.1	5	1.4	7.6	4	0.4	9.2	1	0.4	2.3	6	1.1	26.6	4	3.7	17.7

Diseases of the circulatory system.....	53	3.5	80.3	8	2.2	12.1	35	3.6	80.5	5	1.9	11.5	18	3.4	79.9	3	2.7	13.3
Organic diseases of the heart.....	41	2.7	62.1	7	1.9	10.6	26	2.7	59.8	5	1.9	11.5	15	2.8	66.6	2	1.8	8.9
Other diseases of the circulatory system.....	12	.8	18.2	1	.3	1.5	9	.9	20.7	.....	.....	.....	3	.6	13.3	1	.9	4.4
Diseases of the respiratory system.....	149	9.9	225.6	56	15.2	84.9	90	9.2	207.0	42	16.2	96.6	59	11.3	261.8	14	12.9	62.1
Colds.....	36	2.4	54.5	20	5.4	30.3	23	2.3	52.9	14	5.4	32.2	13	2.5	57.7	6	5.5	26.6
Pneumonia (all forms).....	63	4.2	95.4	5	1.4	7.6	31	3.2	71.3	2	.8	4.6	32	6.1	142.0	3	2.8	13.3
Other diseases of the respiratory system.....	50	3.3	75.7	31	8.4	47.0	36	3.7	82.8	26	10.0	59.8	14	2.7	62.1	5	4.6	22.2
Diseases of the digestive system.....	157	10.4	237.9	48	13.0	72.7	109	11.1	250.7	34	13.1	78.2	48	9.1	212.9	14	12.8	62.1
Diseases of the pharynx.....	19	1.3	28.8	6	1.6	9.1	13	1.3	29.9	5	1.9	11.5	6	1.1	26.6	1	.9	4.4
Diseases of the stomach.....	64	4.2	97.0	28	7.6	42.4	44	4.5	101.2	20	7.7	46.0	20	3.8	88.7	8	7.3	35.5
Appendicitis.....	23	1.5	34.8	3	.8	4.5	15	1.5	34.5	3	1.2	6.9	8	1.5	35.5	.....	.....	.....
Other diseases of the digestive system.....	51	3.4	77.3	11	3.0	16.7	37	3.8	85.1	6	2.3	13.8	14	2.7	62.1	5	4.6	22.2
Nonvenereal diseases of the genitourinary system and annexa.....	80	5.3	121.2	24	6.5	36.4	47	4.7	108.1	14	5.4	32.2	33	6.2	146.4	10	9.2	44.4
Diseases of the kidneys and annexa.....	38	2.5	57.6	11	3.0	16.7	22	2.2	50.6	4	1.5	9.2	16	3.0	71.0	7	6.4	31.1
Other diseases of the genitourinary system.....	42	2.8	63.6	13	3.5	19.7	25	2.5	57.5	10	3.9	23.0	17	3.2	75.4	3	2.8	13.3
The puerperal state.....	45	2.9	68.1	9	2.5	13.7	23	2.2	50.6	5	2.0	11.5	23	4.4	102.0	4	3.6	17.8
Pregnancy.....	2	.1	3.0	4	1.1	6.1	2	.2	4.6	2	.8	4.6	.....	.....	.....	2	1.8	8.9
Normal childbirth.....	40	2.6	60.6	5	1.4	7.6	20	2.0	46.0	3	1.2	6.9	20	3.8	88.7	2	1.8	8.9
Other diseases and conditions of the puerperal state.....	3	.2	4.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.6	13.3	.....	.....	.....
Diseases of the skin and cellular tissue.....	13	.0	19.7	8	2.2	12.1	11	1.1	25.3	7	2.7	16.1	2	.4	8.9	1	.9	4.4
Diseases of the bones and organs of locomotion.....	20	1.3	30.3	6	1.6	9.1	14	1.4	32.2	4	1.5	9.2	6	1.1	26.6	2	1.8	8.9
Mutilations.....	2	.....	3.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old age.....	31	2.1	47.0	4	1.1	6.1	15	1.5	34.5	4	1.5	9.2	16	3.0	71.0	.....	.....	.....
External causes.....	68	4.5	103.0	10	2.7	15.1	42	4.3	96.6	7	2.7	16.1	26	4.9	115.4	3	2.8	13.3
Ill-defined diseases.....	118	7.8	178.8	29	7.0	43.9	81	8.2	186.3	24	9.2	55.2	37	7.0	164.2	5	4.6	22.2
Permanent disabilities.....	20	1.3	30.3	6	1.6	9.1	9	.9	20.7	3	1.2	6.9	11	2.1	48.8	3	2.8	13.3

The returns for North Carolina differ in a number of important respects from those found in Rochester. The season of the year, the varying climatic and geographical conditions, and, most important, the different racial composition of the North Carolina population, have brought about a picture which is considerably at variance with the one previously obtained. It is interesting to note that the North Carolina population exhibits a higher rate of sickness with disability than the population of Rochester, as regards typhoid fever, pulmonary tuberculosis, cerebral hemorrhage, apoplexy and paralysis, and pneumonia. Malaria, a disease of no numerical importance in Rochester, constituted 4.4 per cent of all cases of sickness with disability in North Carolina, with a rate of 101.5 per hundred thousand exposed. The high influenza rate (189.4) is probably indicative of epidemic conditions in North Carolina at the time of the survey; this is significantly accompanied by a pneumonia rate of 95.4, in contrast to only 17.4 in Rochester (constituting 4.2 per cent of all cases as opposed to 0.9 per cent). "Colds" are also noteworthy in North Carolina (2.4 per cent), while they were negligible in Rochester. Pellagra was present to a significant extent in North Carolina, but it did not occur in Rochester. On the other hand, the North Carolina rates for cancer and for organic diseases of the heart are more favorable. It is probable that the figures for both pellagra and cancer are understatements, many cases of the former being concealed under the guise of "mental alienation" and "other diseases of the digestive system," while cases of the latter were probably returned as diseases of the digestive system, of the genitourinary system, and of other seats of the disease. Bronchitis and asthma, which were responsible for 31.9 and 46.4 cases per 100,000, respectively, in Rochester, did not occur in North Carolina in any considerable degree.

Rheumatism (all forms) is again the most important single condition, being responsible for 9.3 per cent of all cases and for a rate of 213.6 per 100,000; the rate in Rochester was 211.7. In the Federal census of sickness in 1890 it was likewise found that the various forms of rheumatism together constituted the largest single item in the list of diseases; at that time, however, the rate obtained was 432 per 100,000, or over twice that of our studies.

General diseases were, as a group, responsible for the largest share of the morbidity, accounting altogether for 859 cases per 100,000 exposed (37.5 per cent of all cases); diseases of the nervous system and of the organs of special sense came next, with a rate of 286.3 per 100,000 (12.6 per cent of the total morbidity). The relationship was exactly reversed in Rochester; diseases of the nervous system stood first, with a rate of 492.9 per 100,000 (25.7 per cent) and the general diseases came next with a rate of only 481.3 per 100,000

(25.1 per cent). Mental alienation (insanity) was responsible for only 1.1 per cent of the morbidity of North Carolina, in contrast to 3.8 per cent in Rochester. The lesser prominence of nervous diseases in North Carolina is perhaps the result of the mode of life in a State largely rural in character, in contrast with that of an industrial urban community like Rochester. Diseases of the digestive system are not materially different in their proportional frequency from the corresponding ratios in the two previous surveys, constituting about one-tenth of the total cases. The puerperal state presents a smaller proportion of cases than in Rochester; the same is true of external causes (accidents). Twenty cases in North Carolina were ascribable to "permanent disabilities" such as blindness.

If we differentiate according to race the cases of sickness involving disability, it appears that general diseases are more prominent in the white group (39.9 per cent) than among the colored (32.9 per cent). A few of the general diseases show higher percentages for the colored, however. Thus influenza constitutes 7 per cent of all cases in the group of the whites, as opposed to 10.6 per cent among the colored. With this is again to be associated the fact that, in the class of respiratory diseases, "colds" and pneumonia constitute only 2.3 and 3.2 per cent, respectively, of the morbidity of whites, in contrast to 2.5 and 6.1 per cent among the colored. The rates for the acute infectious diseases of children are characteristically low for negroes. Malaria accounts for 6 per cent of all cases in the white race, and for only 1.5 per cent among the colored. Tuberculosis of the lungs, it is surprising to note, is represented by a sickness rate of 142.6 per 100,000 among the whites, in contrast to only 93.2 per 100,000 among the colored (6.3 and 4 per cent, respectively, of all cases.) Cancer was found proportionally twice as prevalent among negroes in this survey as among whites.

The diseases of the nervous system and of the organs of special sense are represented by a larger proportion of cases among the colored (14.3 per cent) than among the white (11.5 per cent); the corresponding rates are 337.2 per 100,000 for the colored and 259.9 among the white. Cerebral hemorrhage, apoplexy and paralysis, mental alienation, and diseases of the eyes and their annexa are all commoner in the colored race enumerated in this survey; it is only the miscellaneous title, "other diseases of the nervous system" which shows a larger percentage (6.8 per cent) of cases among the white than among the colored (3.6 per cent). Diseases of the circulatory system are of about equal prevalence in the two races. As has already been pointed out, the diseases of the respiratory system are of proportionally greater frequency among the colored than among the whites, although here again the miscellaneous title, "other diseases of

the respiratory system," shows the opposite tendency. Diseases of the digestive system constitute slightly higher proportions of the morbidity of whites than of that of the colored. Nonvenereal diseases of the genitourinary system and annexa, on the other hand, show a slightly higher frequency for the colored (6.2 per cent) than for the whites (4.7 per cent). The puerperal state constitutes 2.2 per cent of the cases among whites, and exactly twice that proportion among the colored. External causes (accidents) account for a slightly larger proportion of cases among the colored (4.9 per cent) than among whites (4.3 per cent).

It has already been pointed out that of the 1,512 cases involving disability only 46 received hospital treatment. Of 83 cases of pulmonary tuberculosis only 3 were being cared for in hospitals; of 20 typhoid fever cases only 1 was receiving such treatment. Eleven out of 16 cases of mental alienation and 6 out of 23 cases of appendicitis were being cared for in hospitals. The remaining hospital cases represented a widely scattered list of diseases. Out of 63 cases of pneumonia not one was receiving hospital treatment.

Thus far we have concerned ourselves only with the sick who were unable to work. Without devoting much attention to the group of those able to work, we may nevertheless note with interest that the relationships are somewhat different from those obtaining in the other group. Among the cases not involving disability there is a greater proportionate incidence of diseases of the respiratory system and, in some degree, of these of the digestive and of the genitourinary systems. There is a corresponding reduction in the proportionate frequency of the other groups of diseases. These differences are more marked among the whites than among the colored. It is important to note the presence of 17 cases of pulmonary tuberculosis, 31 cases of rheumatism, 7 cases of heart disease, and 11 cases of kidney disease, which, while they indicate serious physical disturbance, nevertheless do not incapacitate the individual for work.

It is realized that the statements of disease made in the course of this survey are the result of an enumeration by a body of laymen (the insurance agents). The same merit is not therefore as readily accorded to them as would be given to the reports of physicians. To determine the accuracy with which these returns of disease were made, a group of over 100 physicians, whose names had been reported as attending a large proportion of the cases of sickness, were canvassed with the request that the individual diagnoses submitted by the families be confirmed or denied. It is a matter of considerable encouragement to the writers that in 207 replies from 102 physicians in the State, 131 enumerators' statements of diagnosis were confirmed, 4 reports were reversed, and 10 replies from physicians gave the names of diseases in place of the enumerators' statements of symp-

toms. In 62 cases, the physicians had lost track of the patients, had no record of the diseases treated, or the patients had simply given the physician's name as "family doctor" without having been under treatment. In the 145 cases where the physician did recall the case, only four instances of change in the enumerators' statements were indicated.

This confirms our previous impression that the method employed in these studies is essentially an acceptable one for the determination of the main facts of community sickness. Further confirmation of the validity of our returns is obtained from the following table, which presents the causes of sickness reported by the company's nurses visiting sick policyholders in the State of North Carolina during 1915:

TABLE 7.—Number and percentage of cases visited in North Carolina during 1915 by visiting nurse service—Principal diseases and conditions.

Disease or condition.	Number of cases.	Percentage of total.
All diseases and conditions.....	2,130	100.0
Typhoid fever.....	82	3.8
Malaria.....	208	9.8
Measles, scarlet fever, whooping cough, diphtheria, and croup.....	16	.8
Influenza.....	209	9.8
Pellagra.....	49	2.3
Tuberculosis of the lungs.....	63	3.0
Rheumatism (all forms).....	50	2.3
Pneumonia (all forms).....	161	7.6
Diseases of the digestive system.....	260	12.2
Tonsillitis.....	39	1.8
Diseases of the kidneys and annexa.....	43	2.0
Puerperal state.....	255	12.0
External causes.....	100	4.7
All other diseases and conditions.....	595	27.9

A number of factors are involved which prevent a close agreement between these figures and the proportionate representation of the several diseases in our sickness survey. The survey was made during a single week and was consequently subject to the influence of seasonal factors, whereas the nursing service report covers an entire year. Furthermore, the service dispensed by the company involves a certain element of selection, so that the acute diseases, as also the puerperal state, are inevitably more prominent than they would be in a general statement of morbidity. It is significant, nevertheless, to note that typhoid fever constitutes 3.8 per cent of the total in the nursing service figures and 1.3 per cent of the total determined by the survey; malaria is responsible for 9.8 per cent of the cases handled by the company's visiting nurse service, another confirmation and accentuation of the figures previously determined. Influenza (9.8 per cent) and pellagra (2.3 per cent) are significantly prominent. Pneumonia (7.6 per cent) is likewise high, in accordance with our survey findings.

Disease in Relation to Age.

The distribution of the cases of sickness by age has already been discussed in a previous section (see p. 2824). It may now be of interest to consider individual diseases as factors in the morbidity at the various ages. For this purpose we shall, for convenience, distinguish four age periods: First, the ages below 15, in which there are 313 cases of sickness; second, ages 15 to 34, with 598 cases; third, ages 35 to 54, with 566 cases; and, finally, ages 55 and over, with 396 cases. There were 8 cases in which the age of the sick person was unknown. Each of the four age periods is characterized by certain diseases which are of comparatively little prominence in the other age periods. The acute infectious diseases, such as measles, scarlet fever, whooping cough, and diphtheria, are found preponderantly in the first age period. Out of a total of 71 cases only 11 occurred after age 15. Typhoid fever shows a considerable proportion of cases in the first age period—8 out of 20. Similarly, 30 cases of pneumonia (largely broncho-pneumonia) out of a total of 68 occurred in this period.

The second age period, 15 to 34, is characterized by the presence of a large number of cases of tuberculosis—58 out of a total of 100. Thirty-one cases of malaria out of 76, and 19 cases of pellagra out of 39, also occurred during these years. There were 10 cases of mental alienation out of a total of 16, and 42 cases of influenza out of a total of 150. Among females, the puerperal state and its concomitants are chiefly represented in this age period.

The third age period, 35 to 54, includes almost all of the cases of cancer and the largest proportion of cases of rheumatism and influenza. External causes are heavily represented in this period, 25 out of the 78 cases occurring at this time. Cerebral hemorrhage, apoplexy and paralysis, and organic diseases of the heart are also represented strongly in this age period.

Rheumatism and influenza retain their prominence in the final age period—that is, 55 and over—but the bulk of the diseases in this period consists of the so-called degenerative diseases, such as cerebral hemorrhage, apoplexy and paralysis—48 out of a total of 85 cases. There are 18 cases of organic diseases of the heart out of a total of 48, and 16 cases of kidney disease out of a total of 49.

A number of conditions, such as colds, pneumonia, diseases of the stomach, and diseases of the nervous system, occur throughout life, without any marked concentration in a single age period.

The following table presents the principal facts in the distribution of the cases of sickness by disease and age period:

TABLE 8.—Number of cases of principal diseases and conditions at specified age periods.

Disease or condition.	Number of cases at specified age periods.					
	All ages.	Under 15.	15 to 34.	35 to 54.	55 and over.	Un-known.
All diseases and conditions.....	1,881	313	598	566	396	8
Typhoid fever.....	20	8	8	1	3	
Malaria.....	76	18	31	17	10	
Measles, scarlet fever, whooping cough, diphtheria..	71	60	10		1	
Influenza.....	150	13	42	54	41	
Pellagra.....	39	3	19	12	5	
Tuberculosis of the lungs.....	100	3	58	30	9	
Cancer (all forms).....	10		1	8	1	
Rheumatism.....	172	3	30	70	69	
Cerebral hemorrhage, apoplexy, and paralysis.....	85	3	7	27	48	
Mental alienation.....	16		10	6		
Organic diseases of the heart.....	48	2	7	19	18	2
"Colds".....	56	24	13	13	3	3
Pneumonia (all forms).....	68	30	20	11	7	
Diseases of kidneys.....	49	1	11	20	16	1
Puerperal state.....	54		44	10		
External causes.....	78	14	23	25	16	

Duration of Sickness.

The following table shows the distribution of the total cases of sickness according to the duration of illness up to the date of inquiry:

TABLE 9.—Number of cases of sickness at each duration period in North Carolina.

Duration of sickness.	Number of cases in specified duration period.	Percentage of total known durations.
All durations.....	1,881	100.0
1 day.....	36	2.1
1 day to 1 week.....	228	13.4
1 to 2 weeks.....	187	10.8
2 to 3 weeks.....	139	8.2
3 weeks to 1 month.....	97	5.7
1 to 2 months.....	173	10.2
2 to 3 months.....	81	4.8
3 to 6 months.....	135	8.0
6 months to 1 year.....	121	7.1
1 to 3 years.....	257	15.1
3 years and over.....	244	14.4
Unspecified.....	183	

The 1,881 cases of sickness thus distributed showed slightly different characteristics than those recorded in the Rochester Survey. In North Carolina 2.1 per cent of the total cases with period of sickness specified had a duration of only one day; this compares with a figure of 1.1 per cent for the Rochester enumeration. The North Carolina returns showed 40.2 per cent of the total cases of sickness with durations less than one month as compared with a proportion of 22.6 per cent for the Rochester material. A similarly interesting fact is that

the North Carolina cases exhibited 63.2 per cent of the durations under six months; the Rochester finding for total sickness for the same duration period was 39.4 per cent. In each instance these percentages are based upon the total cases with specified duration.

The comparatively large proportion of cases of short durations is accounted for by the types of diseases observed; the North Carolina enumeration developed a preponderance of acute diseases. The following table gives the durations of the individual diseases and conditions resulting in disability for work:

TABLE 10.—*Diseases and conditions among sick and unable to work classified by duration of sickness and by sex.*

Disease or condition; sex.	All durations.	Duration of sickness											
		1 day.	Over 1 day and under 1 week.	1 week and under 2 weeks.	2 weeks and under 3 weeks.	3 weeks and under 1 month.	1 month and under 2 months.	2 months and under 3 months.	3 months and under 6 months.	6 months and under 1 year.	1 year and under 3 years.	3 years and over.	Not specified.
All diseases and conditions.....	1,512	32	201	153	124	84	155	73	118	95	204	163	110
Males.....	595	14	83	51	49	29	51	26	50	30	102	67	43
Females.....	917	18	118	102	75	55	104	47	68	65	102	96	67
Malaria.....	67	6	30	6	8	2	5	3	3	1	.....	.....	3
Males.....	23	2	13	2	2	.....	1	1	2	.....	.....	.....	.....
Females.....	44	4	17	4	6	2	4	2	1	1	.....	.....	3
Influenza.....	125	4	23	28	23	9	19	8	11	.....	.....	.....	.....
Males.....	44	2	6	8	11	4	5	5	3	.....	.....	.....	.....
Females.....	81	2	17	20	12	5	14	3	8	.....	.....	.....	.....
Pellagra.....	24	.....	.....	.....	.....	.....	.....	.....	2	5	14	2	1
Males.....	10	.....	.....	.....	.....	.....	.....	.....	1	1	7	.....	1
Females.....	14	.....	.....	.....	.....	.....	.....	.....	1	4	7	2	.....
Tuberculosis of the lungs.....	83	.....	.....	.....	.....	2	3	9	12	16	34	6	1
Males.....	32	.....	.....	.....	.....	1	1	2	6	4	15	3	.....
Females.....	51	.....	.....	.....	.....	1	2	7	6	12	19	3	1
Rheumatism.....	141	.....	9	12	6	6	13	7	14	9	21	38	6
Males.....	50	.....	3	2	2	2	2	3	8	2	13	11	2
Females.....	91	.....	6	10	4	4	11	4	6	7	8	27	4
Cerebral hemorrhage, apoplexy, and paralysis.....	77	.....	.....	.....	1	3	3	2	11	7	25	21	4
Males.....	39	.....	.....	.....	1	2	1	1	5	.....	16	12	1
Females.....	38	.....	.....	.....	.....	1	2	1	6	7	9	9	3
Organic diseases of heart.....	41	.....	3	.....	4	4	3	1	5	6	8	6	1
Males.....	17	.....	1	.....	1	.....	.....	1	3	3	6	2	.....
Females.....	24	.....	2	.....	3	4	3	.....	2	3	2	4	1
Pneumonia (all forms).....	63	1	8	10	10	8	12	8	2	1	.....	.....	3
Males.....	32	1	5	6	6	1	9	2	1	.....	.....	.....	1
Females.....	31	.....	3	4	4	7	3	6	1	1	.....	.....	2
Diseases of the stomach.....	64	4	5	8	7	4	6	1	4	6	10	6	3
Males.....	22	2	3	3	2	1	1	.....	1	2	6	1	.....
Females.....	42	2	2	5	5	3	5	1	3	4	4	5	3
Bright's disease and other diseases of kidneys.....	38	.....	2	1	5	.....	3	2	5	5	8	5	2
Males.....	20	.....	1	1	.....	.....	1	2	1	4	6	3	1
Females.....	18	.....	2	.....	4	.....	2	.....	4	1	2	2	1
All other diseases and conditions.....	789	17	121	88	60	46	88	32	49	39	84	79	86
Males.....	306	7	52	29	23	18	30	9	19	14	33	35	37
Females.....	483	10	69	59	37	28	58	23	30	25	51	44	49

The duration of the illness was specified in 1,402 cases out of a total of 1,512 who were sick and unable to work. The individual diseases and conditions responsible for this disability varied considerably in the distribution of their durations. Over one-half of the malaria cases, for example, had a duration less than one week, while one-fifth of the influenza cases had a similarly short duration. Pneumonia cases were found well under one month in duration for most of the cases. Pellagra, tuberculosis of the lungs, rheumatism, cerebral hemorrhage, apoplexy and paralysis, organic diseases of the heart, all showed most of their cases in duration periods more than six months and even over one year.

It was possible also to compute average durations of illness per case in a number of diseases. For malaria there was an average of 18.2 days per case, for influenza 25.1 days per case, and for pneumonia 28.7 days per case. For the chronic diseases like pellagra, tuberculosis of the lungs, rheumatism, organic diseases of the heart, and diseases of the kidneys, the facts are not quite so clear and it has been more difficult to calculate the average durations. In these conditions the returns often gave such broad statements of durations as "two years," "four years," etc. Such statements represent, perhaps, the best recollection of the patient or the members of the family and must be taken as such. For the acute diseases, however, the average duration is probably as accurately stated as the practical purposes of this study demand. It is to be understood, moreover, that the durations of sickness as given cover only the period to the date of the inquiry and are, therefore, not completed durations. For those diseases which are represented in considerable numbers, as, for example, influenza, pneumonia, etc., the average completed durations per case are probably twice the periods quoted above.

A tabulation was prepared also for the group of persons sick but able to work. These facts are presented in the following table:

TABLE 11.—*Diseases and conditions among sick but able to work, classified by duration of sickness and by sex.*

Disease or condition; sex.	Number of persons sick for specified duration periods.												
	All durations.	1 day.	Over 1 day, under 1 week.	1 week and under 2 weeks.	2 weeks and under 3 weeks.	3 weeks and under 1 month.	1 month and under 2 months.	2 months and under 3 months.	3 months and under 6 months.	6 months and under 1 year.	1 year and under 3 years.	3 years and over.	Not specified.
All diseases and conditions.....	369	4	27	34	15	13	18	8	17	26	53	81	73
Males.....	143	1	9	10	4	5	5	1	6	8	20	36	38
Females.....	226	3	18	24	11	8	13	7	11	18	33	45	35
Malaria.....	9		1	4	1		1					1	1
Males.....	4			1	1							1	1
Females.....	5	1	3	3			1						
Influenza.....	25	1	6	6	4		5	1	2				
Males.....	5		3	3	1				1				
Females.....	20	1	3	6	3		5	1	1				
Pellagra.....	15									4	9	1	
Males.....	3									1	2		
Females.....	12									3	7	1	
Tuberculosis of the lungs.....	17						1			2	7	2	
Males.....	7										3	1	3
Females.....	10						1			2	4	1	2
Rheumatism.....	31		1	1		1	3	1	1	1	9	11	2
Males.....	9					1					3	3	1
Females.....	22		1	1			3	1	1	1	6	8	1
Cerebral hemorrhage, apoplexy and paralysis.....	8									1	3	3	1
Males.....	4											3	1
Females.....	4									1	3		
Organic diseases of the heart.....	7					1				2	1	2	1
Males.....	4					1				1	1	1	
Females.....	3									1		1	1
Pneumonia (all forms).....	5			1			1		1				2
Males.....	2								1				1
Females.....	3			1			1						1
Diseases of the stomach.....	28	1	1	2				1	2	2	6	8	5
Males.....	10	1								2	2	2	3
Females.....	18		1	2				1	2		4	6	2
Bright's disease and other diseases of kidneys.....	11		1					1	2	1	2	2	2
Males.....	6								1	1	2	1	1
Females.....	5		1					1	1			1	1
All other diseases and conditions.....	213	2	17	20	10	11	7	4	8	13	16	51	54
Males.....	89		6	9	2	3	5		3	3	7	24	27
Females.....	124	2	11	11	8	8	2	4	5	10	9	27	27

The 369 cases were for the most part chronic in nature as will be seen by reference to the table. Only malaria and influenza figure in any significant regard in the returns for durations less than one month.

Attendance of Physician.

The amount and character of medical attendance upon sickness is often one of the best indexes of the health standards of a community. In North Carolina out of 1,881 cases, 1,156 or 61.5 per cent had a physician in attendance. Cases among the white race showed a higher proportion of medical attendance upon sickness, namely, 63.6 per cent; the figure for the colored race enumerated was 57.4 per cent.

Persons who were sick and unable to work had a much higher proportion of cases with physician in attendance, 65.7 per cent as

compared with 44.2 per cent for the group of sick persons able to work. The proportions of cases with physician in attendance among white lives approximates the figures developed in our Rochester survey. In a measure, this close correspondence is another evidence of the essential accuracy of the two surveys.

The proportions of cases with physician in attendance vary with particular diseases. Among the sick who are unable to work, rheumatism among white persons shows a proportion of only 50 per cent of the cases with physician in attendance. Pneumonia among white persons shows a record of physician in attendance in 90.3 per cent of the cases. In general the acute diseases seem to have the higher proportions of cases with physician in attendance and the chronic conditions such as tuberculosis of the lungs, rheumatism, cerebral hemorrhage, apoplexy and paralysis, and diseases of the stomach, the lesser figures.

TABLE 12.—Cases attended by physician or treated in institution, classified by extent of disability for selected diseases.

Extent of disability and color.	Total cases.	Cases with physician in attendance.	Per cent physician in attendance.
TOTAL SICK PERSONS.			
All diseases (total).....	1,881	1,156	61.5
White.....	1,243	790	63.6
Colored.....	638	366	57.4
UNABLE TO WORK.			
All diseases (total).....	1,512	993	65.7
White.....	983	659	67.0
Colored.....	529	334	63.1
Typhoid fever:			
White.....	14	10	71.4
Colored.....	6	5	83.3
Malaria:			
White.....	59	32	54.2
Colored.....	8	6	75.0
Influenza:			
White.....	69	43	62.3
Colored.....	56	38	67.9
Pellagra:			
White.....	22	17	77.3
Colored.....	2	2	100.0
Tuberculosis of the lungs:			
White.....	62	53	85.5
Colored.....	21	15	71.4
Rheumatism:			
White.....	88	44	50.0
Colored.....	53	30	56.6
Cerebral hemorrhage, apoplexy, and paralysis:			
White.....	32	17	53.1
Colored.....	45	15	33.3
Organic diseases of the heart:			
White.....	26	23	88.5
Colored.....	15	15	100.0
Pneumonia (all forms):			
White.....	31	28	90.3
Colored.....	32	31	96.9
Diseases of the stomach:			
White.....	44	25	56.8
Colored.....	20	14	70.0

TABLE 12.—Cases attended by physician or treated in institution, classified by extent of disability for selected diseases—Continued.

Extent of disability and color.	Total cases.	Cases with physician in attendance.	Per cent physician in attendance.
UNABLE TO WORK—continued.			
Diseases of the kidneys and annexa:			
White.....	22	16	72.7
Colored.....	16	13	81.3
All other diseases and conditions:			
White.....	514	351	68.3
Colored.....	255	150	58.8
ABLE TO WORK.			
All diseases (total).....	369	163	44.2
White.....	260	131	50.4
Colored.....	109	32	29.4
Malaria:			
White.....	7	2	28.6
Colored.....	2	0	0.0
Influenza:			
White.....	18	9	50.0
Colored.....	7	5	71.4
Pellagra:			
White.....	14	9	64.3
Colored.....	1	0	0.0
Tuberculosis of the lungs:			
White.....	15	8	53.3
Colored.....	2	1	50.0
Rheumatism:			
White.....	15	7	46.7
Colored.....	16	4	25.0
Diseases of the stomach:			
White.....	20	15	75.0
Colored.....	8	2	25.0
All other diseases and conditions:			
White.....	171	81	47.4
Colored.....	73	20	27.4

Sickness in Relation to Occupation.

The plans for the sickness survey in North Carolina provided for an enumeration of both the well and the sick by occupation. It was hoped, in this way, to secure statistics which would throw light on the relation between occupation and the sickness rate. In the survey of Rochester, no dependable tabulations could be made under this head, because of the large number of occupations represented in the exposure and the small number of persons sick in each occupation class. The resulting sickness rates would have been without significance. The North Carolina survey, on the other hand, disclosed the fact that a large number of persons of both sexes were engaged in textile manufacture, principally in the cotton mills. In all there were 9,244 persons so employed. This group was of sufficient numerical importance to justify a further subdivision of the data on the basis of color, sex, and age period.

Among this group of textile workers 216 persons were reported sick. In the classification of these sick persons no distinction was made between those able and those not able to work. The total sick-

nesses at all ages were represented by a rate of 23.4 per 1,000 exposed—a proportion lower than that found in the survey taken as a whole. The white males and white females among textile workers also showed rates which were considerably lower than those occurring in the general group for the entire State; this applied not only to all ages taken together, but also to most of the age periods separately considered. Colored males and females employed in the textile industry in North Carolina were very few in number—144 and 84, respectively. The number of cases of sickness in this group was correspondingly small.

The following table gives the results of the sickness inquiry among white textile workers:

TABLE 13.—Cases of sickness among white textile workers and rates per 1,000 exposed, by age and by sex.

Age period.	White males.			White females.		
	Number exposed.	Number sick.	Rate per 1,000.	Number exposed.	Number sick.	Rate per 1,000.
All ages.....	5,238	112	21.4	3,778	95	25.1
Under 15.....	398	4	10.1	398	6	15.1
15 and over.....	4,840	108	22.3	3,380	89	26.3
15 to 24.....	2,135	25	11.7	2,312	56	24.2
25 to 34.....	1,246	29	23.3	663	19	28.7
35 to 44.....	701	15	21.4	265	11	41.5
45 to 54.....	433	13	30.0	89	2	22.5
55 to 64.....	261	20	76.6	45	1	22.2
65 and over.....	64	6	93.8	6	.....	.....

It may be posited, therefore, that no untoward conditions of sickness prevail in this industry as compared with the general group of the industrial classes enumerated in this survey.

Economic Loss from Sickness in North Carolina.

We have previously observed that the sickness rates determined by this survey are reasonably minimal. The mortality of April, next to that of September, is the most favorable for any month in the year. The rates of disability derived from the survey, when applied to the computation of sickness losses in the entire State, will therefore produce conservative figures. The white male population of North Carolina, at ages 15 and over, is estimated at 492,585 for the year 1916. On the hypothesis that the sickness rates of the survey remain constant throughout the year, we may assume that, at any time, at least 12,512 white males are sick. This means approximately 3,753,600 days of disability from work for this group of the population, using 300 working days per year for each individual as a basis of calculation. Similarly we may assume that there are 16,835 white females constantly sick throughout the year for a total period of 5,050,500 days of disability from pursuit of the daily

occupations of life. Among colored males our estimate is 1,561,200 days of disability for 5,204 persons constantly sick, and for colored females a total period of disability of 2,607,900 days for 8,693 persons. No monetary estimates of disability need be computed to emphasize this enormous loss of working time in the productive years of life. Whatever the financial estimate based upon wage loss, we have still to consider the cost of medical attendance, nursing care, and drugs, and the far-reaching effects of sickness in impairing the living and working efficiency of the families affected by the disability of one or more members.

Conclusion.

Again the evidence points favorably to our method of measuring the amount and kind of sickness prevailing in typical American communities. A little over 3 per cent of the population reached in North Carolina, at ages 15 and over, are constantly sick, and in 80.4 per cent the illness is serious enough to render them unable to work. This figure is somewhat higher than that found in Rochester, but not materially so. It is also higher than that reported by Billings in the Eleventh Census study (pp. 474 to 480, vol. 20, pt. 1, 1890) for a group of 12 Northeastern and Southern States; but, considering the different geographical areas covered and the changes that have occurred since 1890, the degree of correspondence between the two sets of figures may be considered as encouraging rather than otherwise. The internal evidence of the reliability of our figures, however, is the most striking. We have seen clearly the regular increase in the rate of sickness with age, as also the increased amount of sickness among females. Finally on the basis of the sickness rate (with disability) for ages 15 and over, we obtain the very interesting deduction that the average number of days of disability per annum, per capita of population, is 7.6 days for white males and 10.2 for white females. The corresponding figures for the colored race are 7.4 days for males and 11.3 for females. These results are in very close agreement with the best data available from official sources, both American and European, as to the number of days of disability per person of working age. The latest German figures covering the year 1913 give 8.8 days for males and 9.8 days for females insured in the sickness societies of that country.¹ We may, therefore, conclude with reasonable certainty that from sickness of from 2½ to 3 per cent of the community at the working ages are constantly sick, involving a loss of about 9 working days per person per year in the entire population. This, we believe, is a safe measure of the loss to the community from this source.

¹ Kaiserliches Statistisches Amt. Die Krankenversicherung im Jahre 1913. Statistik des Deutschen Reichs, Band 277. Berlin, 1915. p. 60.

DRINKING WATER ON INTERSTATE CARRIERS.

A STUDY OF CONDITIONS ON STEAM VESSELS ENGAGED IN INTERSTATE COMMERCE IN THE SANITARY DISTRICT OF THE GREAT LAKES.

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The fact that contaminated drinking-water supplies on board lake carriers cause a marked increase in the typhoid rate among sailors was first pointed out by Cobb, in 1909,¹ at which time he outlined the various arrangements for obtaining drinking water on board vessels, and briefly discussed the methods of contamination.

In 1910 Young² reported an investigation of typhoid fever among the members of crews of lake vessels. In this study he pointed out that the incidence of typhoid fever was higher among seamen on the Great Lakes than among seamen on inland rivers and the sea-coast, concluding also from his statistics that the rate was considerably higher than in lake cities, and that the water supplies of the vessels were in many cases contaminated.

De Valin,³ in 1914, made an epidemiological study of typhoid-fever epidemics on two lake vessels, and in connection with this discussed the question of water supply and sewage disposal somewhat in detail, outlining in a general way possible methods of solution.

In 1909 Young and Judson⁴ suggested that the interstate quarantine regulations might be amended so as to control the disposition of sewage from lake vessels. Active corrective measures were not undertaken at the time, but in 1913 the interstate quarantine regulations were so amended as to put the control of drinking-water supplies aboard interstate common carriers under the supervision of the Public Health Service. Other amendments were subsequently made. At the present time the following regulations relate to the water supplies of interstate common carriers:

REVISED INTERSTATE QUARANTINE REGULATIONS.

SEC. 13. Water provided by common carriers on cars, vessels, or vehicles operated in interstate traffic for the use of passengers shall be furnished under the following conditions:

(a) Water shall be certified by the interstate sanitary officers or the State or other health authorities within whose jurisdiction it is obtained as conforming

¹ "Water contamination aboard ship and its prevention," by Surg. J. O. Cobb, U. S. Public Health Service, *Journal of the American Medical Association*, vol. 53, p. 2057, Dec. 18, 1909.

² "Relation of shipping on the Great Lakes to the spread of typhoid," by Surg. G. B. Young, U. S. Public Health Service, *Second Report of Lake Michigan Water Commission*, p. 97.

³ "Water supplies of ships," by Hugh de Valin, passed assistant surgeon, U. S. Public Health Service, from *Public Health Reports*, vol. 29, No. 7, Feb. 13, 1914.

⁴ "Control of shipping," by Dr. G. B. Young and Maj. W. V. Judson, *First Report of Lake Michigan Water Commission*, p. 125.

to the standard of purity of drinking water supplied to the public by common carriers engaged in interstate traffic, as promulgated by the Secretary of the Treasury on October 21, 1914: *Provided*, That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the aforesaid health officer.

(b) Ice used for cooling such water shall be clear natural ice, or ice made from distilled water or water certified as aforesaid, and before the ice is placed in the water it shall be first carefully washed with water of known safety and handled in such manner as to prevent its becoming contaminated by the organisms of infectious or contagious diseases: *Provided*, That the foregoing shall not apply to ice which does not come in contact with the water which is to be cooled.

(c) Water containers shall be cleansed at least once in each week that they are in operation.

SEC. 14. Common carriers while engaging in interstate traffic shall not furnish to their crews or employees any polluted water for drinking purposes which may contain organisms or materials likely to cause a contagious or infectious disease, nor shall such carriers maintain or permit to be maintained upon their vessels or vehicles, or at or near their stations or other ordinary stopping places over which they have control, any tank, cistern, receptacle, hydrant, or article with water which may contain such impurities, in such manner that water therefrom may be conveniently obtained by the crews and employees mentioned for drinking purposes, unless such common carriers maintain a notice upon said vessels or vehicles and at, near, or upon every said tank, cistern, receptacle, hydrant, pump, well, stream, brook, pool, ditch, or other place or article, with water therein containing such impurities, forbidding the use of such water for drinking purposes by the crews or employees of the said common carriers or by the general public while engaging in interstate commerce.

SEC. 15. No person, firm, or corporation shall furnish water for drinking or cooking purposes to any vessel in any harbor of the United States intending to clear for some port within some other State or Territory of the United States, or the District of Columbia, taken from the waters of such harbor or from any other place where it has been or may have been contaminated by sewer discharges: *Provided*, That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the interstate sanitary officer, or the State or other health authority within whose jurisdiction it is obtained.

SEC. 16. Common carriers operating vessels in commerce between the several States and Territories or the District of Columbia, for passengers in interstate traffic, shall not supply for the use of said passengers any water taken from a lake or stream over which the vessel is being navigated unless the same is certified by the United States Public Health Service or the State or municipal health authority within whose jurisdiction it is obtained as conforming to the bacteriological standard for drinking water promulgated by the Secretary of the Treasury under date of October 21, 1914: *Provided*, That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the aforesaid health authority or by the Surgeon General of the United States Public Health Service or his accredited representative.

Following the promulgation of the above-quoted interstate quarantine regulations and in order to facilitate their enforcement, the continental United States was divided into 12 districts known as interstate sanitary districts. The district of the Great Lakes embraces that portion of the United States lying north of a line beginning at the junction of the seventy-fourth degree of longitude and the Canadian line, and extending south to the forty-second degree of latitude, west to the seventy-eighth degree of longitude, south to the fortieth degree of latitude, west to the ninetieth degree of longitude, north to the forty-sixth degree of latitude, west to the ninety-third degree of longitude, and north to the Canadian line.

The above-described district embraces parts of the States of New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Wis-

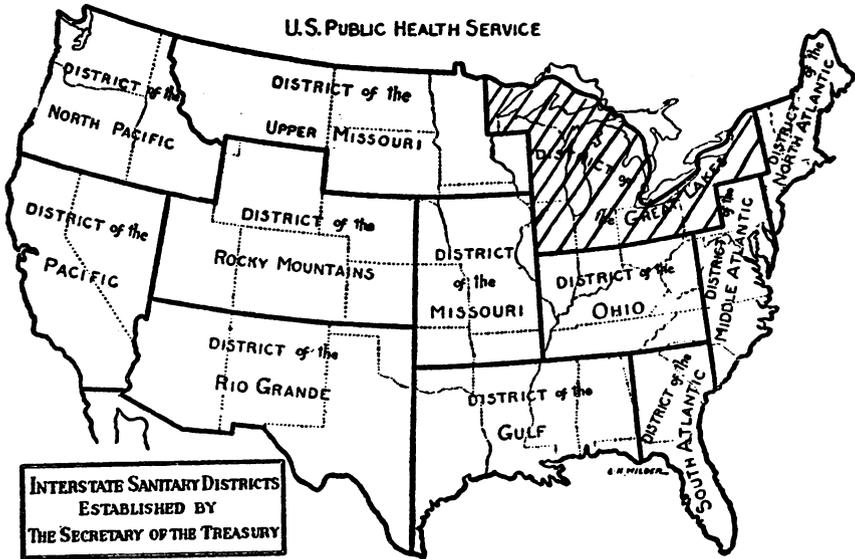


FIG. 1.—Map showing interstate sanitary districts. District of the Great Lakes indicated by diagonal lines.

consin, Minnesota, and the entire State of Michigan. (See fig. 1.) The headquarters and laboratory for this district are at the United States Marine Hospital, 4141 Clarendon Avenue, Chicago, Ill. During the past summer, inspections were made and samples collected from most of the passenger vessels and from some freight vessels on the Great Lakes, the scope of this work being outlined below.

Present Method of Obtaining Drinking Water on Lake Vessels.

Of the two general methods of obtaining drinking water on board lake vessels, the first and most common is by pumping, or by gravity, through a sea cock in the hull of the vessel, and the second by filling the drinking water tanks through a hose from a hydrant on shore.

Sea cocks.—A sea cock consists generally of a flanged valve bolted directly to the shell of the vessel, the water entering the cock through numerous small holes piercing the shell. These holes act as a strainer to prevent solid matter entering the valve. The cocks vary in size from 2 to 10 inches, and are usually placed at a depth of about 8 feet below the water level.

From the sea cock the water is distributed by several methods. In a great many cases the storage tanks are located below the water line, and it is possible to fill them by gravity directly from the sea cock. In other cases the water is pumped into the tanks by the general service pump. A few vessels are equipped with special pumps which are used only for handling fresh water, and on these vessels the tanks are filled with this pump. In the first and last methods it is quite common to find special sea cocks used only for taking in the drinking water supply. In a number of cases, however, the tanks are filled by gravity from the general service sea cock.

Drinking-water storage tanks.—The drinking-water storage tanks well aft, and sometimes in both places. The tanks are usually cylindrical in shape, varying from 3 to 5 feet in diameter, and from 10 to 20 feet in length, and are constructed of heavy galvanized iron or sheet steel. In a few cases, tanks are built in the fantail of the vessel by placing a bulkhead across the ship and allowing the hull to form part of the tank. Such construction is faulty, difficult of access, and in many cases potentially subject to contamination. In two tanks of this type, soil pipes from water closets were found to pass through the tanks, the outlets being bolted to the hull plates. In one of these latter tanks, there was also found to be leakage around the rudder post with consequent contamination. The cover of these tanks consisted of wooden decking, which in some cases was rotted, allowing leakage from near-by poorly kept urinals. These conditions were corrected without delay.

Very few tanks are lined, though sometimes they are coated with "bitumastic enamel," or are given a wash coat of neat cement.

The water of the Great Lakes contains very little sediment, and hence it is unnecessary physically to clean the tanks except at very long intervals. During the summer, pending our investigations, directions were given several freight vessels for disinfecting the tanks with hypochlorite at intervals for the remainder of the season, in lieu of having a man go inside the tank and scrub it, which would most likely increase the contamination rather than lessen it.

Distributing systems.—On most vessels there are two, and in some cases three, systems of water supply: First, the fresh or drinking water which supplies drinking fountains, kitchens, and washbasins; second, the so-called "sanitary" system, which furnishes the water

for flushing toilets; third, the fire system, which is also often used for washing down decks and other purposes. As far as sanitary significance goes, the drinking-water system is the only one under consideration.

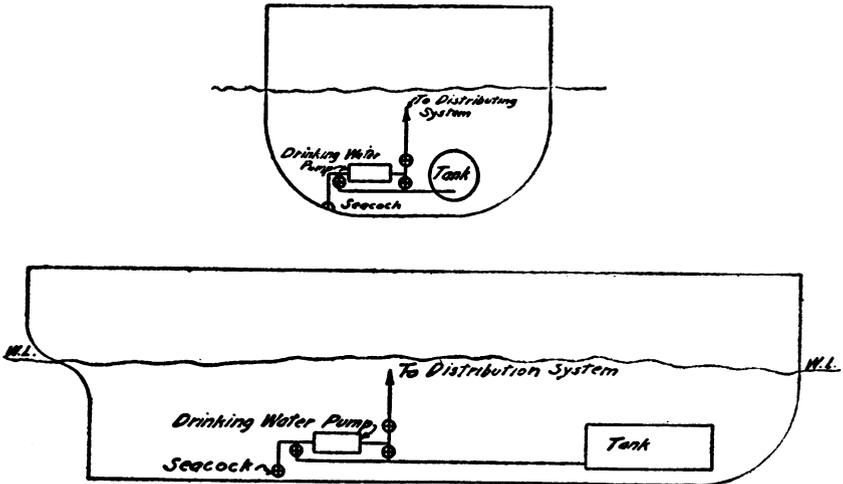


FIG. 2.—Tank filled from sea cock by gravity or by special drinking-water pump. Water distributed by special drinking-water pump.

This water is distributed either by gravity from a storage tank located on an upper deck or by a special distributing pump which maintains a constant pressure in the system. When the tanks are filled by gravity from the sea cock there is always a special distributing pump which takes the water from the tanks. (See fig. 2.)

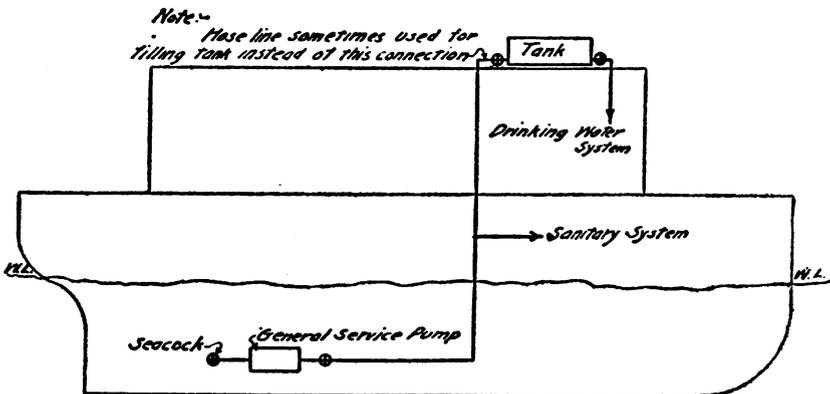


FIG. 3.—Tank filled from sea cock by general service pump. Drinking water distributed by gravity.

When the tanks are filled by the general service pump the water is either distributed by gravity or by a special pump. (See fig. 3.) When a special pump is used for filling the tanks the water is usually distributed by this same pump, although in some cases it may

supply a tank on the upper deck from which the water is distributed by gravity. (See fig. 4.)

The greatest opportunity for the contamination of the drinking-water supply occurs when the tanks are filled by the general service pump. It is customary for the general service pump to be used in port for washing down decks, and upon leaving port for "shooting" ashes, after which the drinking-water tanks are filled, the idea being that during the time taken for "shooting" ashes the sea cock, suction pipe, and manifold are thoroughly cleansed by the force of this flushing. Inasmuch, however, as on some vessels the suction pipe is 8 inches in diameter and 50 feet long, besides containing numerous bends, it is obvious that there is a considerable opportunity for polluting matter to remain in this pipe, even after running the pump in clean water for some time. (See figs. 5 and 6.)

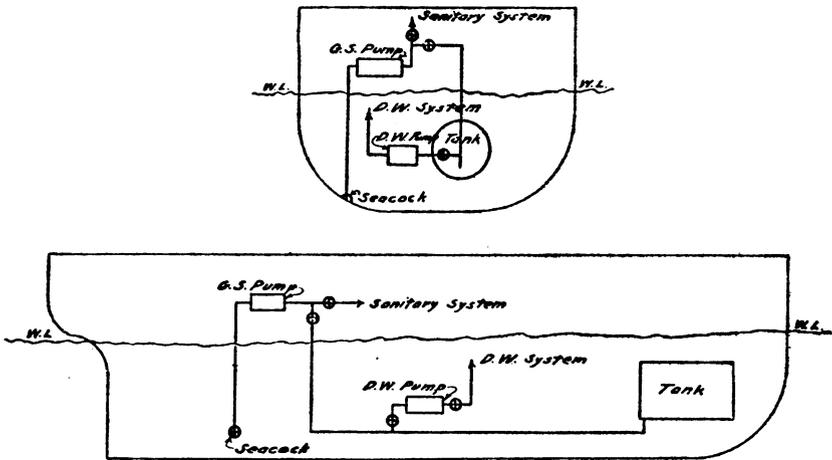


FIG. 4.—Tank filled from sea cock by general service pump. Drinking water distributed by special pump.

Where a special pump is used for filling the tanks, water is pumped through the sea cock only when the vessel is well out in the lake. In a great many cases, however, the sea cock itself is left open all the time, and a valve on the suction line near the pump is opened or closed as water is taken in. This means that the suction line is filled with water at all times. Therefore, when the vessel is lying in port the water in the suction line becomes contaminated. The location of the docks at practically every port on the Great Lakes is such that the vessels lie in very badly polluted water. At Chicago a majority of the boats tie up in the Chicago River below the outlets of several large sewers. At Milwaukee the docks are on the Milwaukee River, which contains an excessive amount of sewage pollution, being, in fact, "septic" most of the time. At Buffalo the docks are on the Buffalo River, where the conditions are worse than

at Milwaukee. At Detroit the docks are along the Detroit River and closely adjacent to many large sewer outfalls. At Cleveland some vessels still dock in Cuyahoga Creek, which is always "septic." The Detroit & Cleveland Navigation Co. and the Cleveland & Buffalo Transit Co., which enter Cleveland, dock at a new pier inside the breakwater, but the water at this point is also contaminated.

On some vessels, in order to protect the drinking-water supply from pollution of this kind, a valve has been placed on the suction line about 3 feet from the fresh-water sea cock, and between this valve and the sea cock a small drainpipe is tapped, controlled by another valve. When not pumping through the sea cock, both the sea cock and the extra valve are closed and the small drainpipe is opened. This prevents the entrance of any contaminated harbor water, since

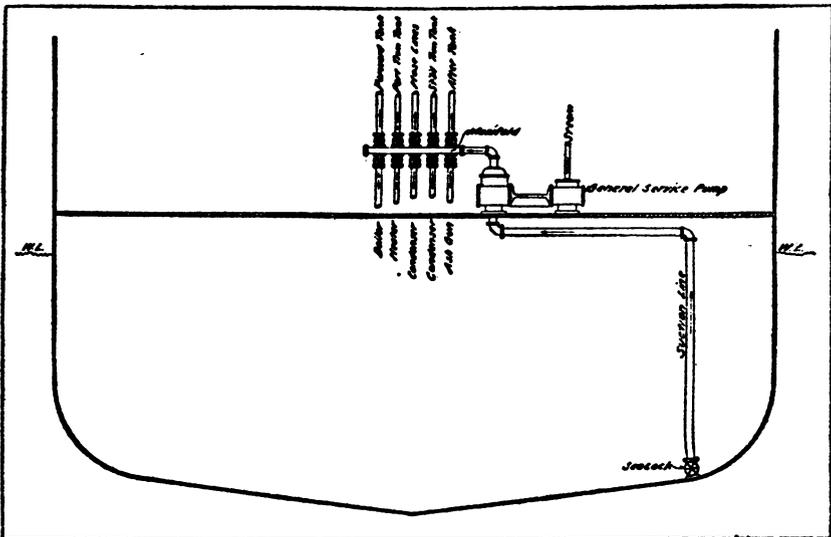


FIG. 5.—Cross section of vessel, showing seacock suction line and manifold.

even if the sea cock leaks the leakage will drain out into the bilge through the small open valve.

By reference to the diagrammatic sketches, figures 2, 3, and 4, the general scheme of obtaining water as outlined above can be seen.

On some vessels where drinking water is distributed from an upper deck tank by gravity this tank is connected directly to the pump by a pipe, or the tank is filled from a hose. (See fig. 3.) This arrangement is preferable, because there is no possibility of water being pumped into the drinking-water tank except when it is specifically intended to do so. That this matter is important is borne out by the fact that at times, through negligence, water is pumped into the tanks when lying at dock, because the system of opening up the pipe line

to the drinking-water tanks when the vessel is passing through a zone of uncontaminated lake water carries with it the possibility, even the probability, of carelessness and forgetfulness in leaving open the valve after the vessel has entered polluted water. It has been stated that a number of times these valves have been left open and the pump has been kept running after vessels had entered the Chicago and Milwaukee Rivers. Employees aboard lake carriers are just as liable to forget as other persons. That this particular act is ever intentional is unlikely, but there is reason for the belief that this accident has happened a number of times. One of the writers (Letton) during the past season while inspecting a vessel found the gravity tank filled with polluted Chicago River water because of the carelessness of the watchman in opening the valve leading to the tank while washing down decks. And even if the duty of collecting drinking water is performed with vigilance, such care can be, and most likely often is, nullified by leaky valves, the defects of which can not be detected except by means of the drip valve described above.

Filling tanks from shore.—When drinking-water tanks are filled from shore, this is done either by carrying the water through a fire hose directly from the hydrant to the tank or by connecting the hose to the distribution system. In most cases vessels that fill their tanks from shore have the pipe systems so arranged that they can also fill through a sea cock directly from the lake, protecting this line from contamination with the valves and drip pipe previously described. As a further protection on some vessels the wheels for operating the valves are removed, as shown in figure 6, so that there shall be no accidental opening of this connection.

Opportunities for contamination.—The opportunities for contaminating the drinking water aboard lake carriers are as follows:

1. Contamination of sea cock or suction pipe while lying in polluted water, due to faulty seating of valves, failure to close valves, or the use of a general service pump.

2. Since in most of the vessels the engine rooms and sea cocks are aft of amidships and since there is usually more or less sewage discharged from toilets in the forward part of the boat, it is possible that some of this fecal matter discharged from the bow is sucked in through the sea cock.

3. Accidental or intentional taking of supplies near shore or in unsafe waters. This may occur when the vessel never goes far from shore, as in running between Chicago and Milwaukee, or when it is in clean water for too short a time to fill its tanks. This situation is aggravated by the fact that the engineer in the engine room can not tell at all times exactly where the vessel is; also by the fact that many ship captains and engineers are not acquainted with all the places

where it is unsafe to take water. There is also the likelihood that engineers and other employees may forget to close the sea cock as the vessel approaches a polluted harbor.

4. There is also more or less possibility of picking up sewage in the wake of other vessels, as for example where one vessel is towing another. That this method of contamination is a real one has been brought out by testimony before the International Joint Commission.¹

Summary.—As a result of the statements made above regarding the taking of a ship's drinking-water supply from the Lakes, it is obvious that it is an impossibility for any vessel operating on the Great Lakes, using the methods at present in vogue, to obtain a drinking water which shall be at all times free from contamination.

It is therefore necessary, in order always to furnish a safe water for drinking purposes, that each vessel shall install some suitable form of water-purification apparatus. Some vessels have already made such attempts. The apparatus used is discussed under the next heading.

Present Methods of Treatment of Water on Board Lake Vessels—Advantages and Disadvantages of Each.

Filtration.—The attempt at water purification most commonly found in use on vessels on the Great Lakes is filtration through small rapid sand filters, there being about 30 vessels using filters of this kind. These filters are used either as the sole means of treatment or as a preliminary step in some other process of purification. The filters vary in size from 10 to 60 inches in diameter. Each filter is equipped with a shunt feed box for adding aluminum sulphate to the water before filtration. (See figs. 7 and 8.)

Filters of the kind above described have an extremely low bacterial efficiency. In fact it is sometimes found that the filter increases rather than decreases the bacterial count. The causes for this inefficiency are many. In the first place, in order to produce efficient results in a rapid sand filter, it is requisite that a coagulant, such as aluminum sulphate, be added to the water in order to form a layer on the surface of the filter sand which will strain out the bacteria, suspended matter, and other impurities. It is also necessary that a certain period elapse between the adding of the coagulating chemical and the passage of the water to the filter, because of the time required for the completion of the chemical reaction. If this necessary time is not given, the coagulation will take place for the most part throughout the filter body and perhaps in the filtered

¹Hearings of the International Joint Commission on Remedies for the Pollution of Boundary Waters Between the United States and Canada, pp. 225-285.

water. In filters of the above type, the water receives the chemical on entering the filter, so that no time is allowed for coagulation. This system of adding the coagulant was found to be very unreliable, because there is no simple method for determining when the chemical is exhausted. During inspections of vessels having filters, statements made by the engineers showed that the periods between refilling the chemical tank varied from one week to once a season. Probably 10 or 15 boxes were examined at the time of inspection and in none of them was any chemical found.

The question of the rate of filtration introduces another cause of inefficiency. There is no method of preventing the rate being whatever the capacity of the pump supplying the filter makes it. As a result loads far in excess of their rated capacity are undoubtedly put upon these filters. Then, again, the rate varies widely, this fluctuation greatly tending to allow foreign matter to penetrate the sand body. Another disadvantage of filters, as found on lake carriers, is that for some time after washing, unless they are allowed to filter to waste for a considerable period, there will be a decided increase in the bacterial count. Therefore, it is believed that the ordinary small pressure rapid sand filter, with the alum shunt feed, without auxiliary sterilizing apparatus, is dangerous rather than beneficial to a vessel, owing to the fact that it gives false security.

On two vessels there are sand filters of a type somewhat different from that described above. In this apparatus the water first passes between a series of iron plates so connected with an electric current as to form electrodes. The action of this electrode box is to cause a precipitation of iron hydrate, which is a good coagulant and one easy to remove by filtration. From the electrode box the water passes to a small coagulating chamber, where some time is given for the coagulant to collect and partly settle. From this coagulating chamber the water passes through two small rapid sand pressure filters, connected in series. The apparatus is arranged to act automatically, so that the electric current is on only when water is being drawn through the system. It is so designed that the filters can be washed one at a time, the wash water being furnished by the filter in operation. While the results given by this apparatus are somewhat better than those from the type first described, there are still a number of defects which result in a poorly filtered water during a considerable portion of the time.

Ultra-violet ray sterilization.—Thirteen boats operating during the past season were equipped with apparatus for sterilizing their drinking water by ultra-violet rays. Eleven of these vessels used a "pressure-type" apparatus and two a "gravity-type." The pressure type of apparatus consists of a cast-iron cylindrical shell, with a quartz tube

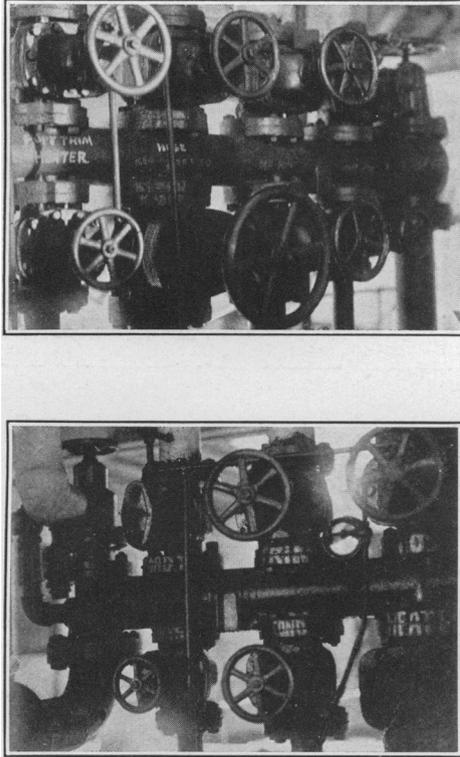


FIG. 6.—PHOTOGRAPHS OF MANIFOLDS ON TWO VESSELS. LOWER PHOTOGRAPH SHOWS WHEEL ON VALVE CONTROLLING LINE LEADING TO FORWARD TANK REMOVED. DRAIN VALVE FOR DETECTING LEAKAGE CAN BE SEEN ABOVE THIS VALVE.

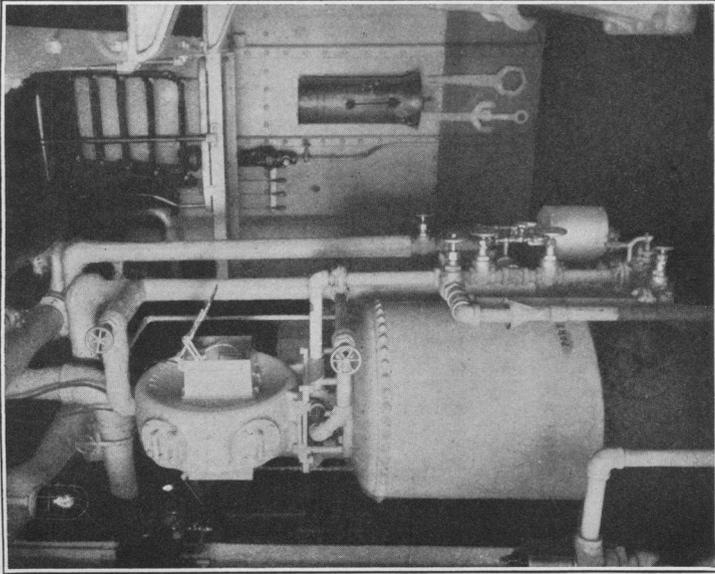


FIG. 7.—VESSEL EQUIPPED WITH RAPID SAND FILTER WITH SHUNT FEED COAGULANT BOX AND PRESSURE TYPE ULTRA-VIOLET RAY APPARATUS.

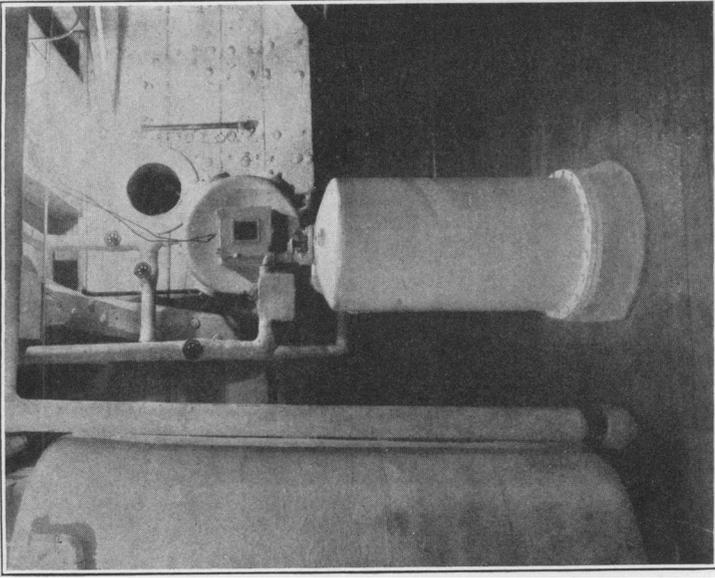


FIG. 8.—VESSEL EQUIPPED WITH RAPID SAND FILTER WITH SHUNT FEED COAGULANT BOX AND PRESSURE TYPE ULTRA-VIOLET RAY APPARATUS.

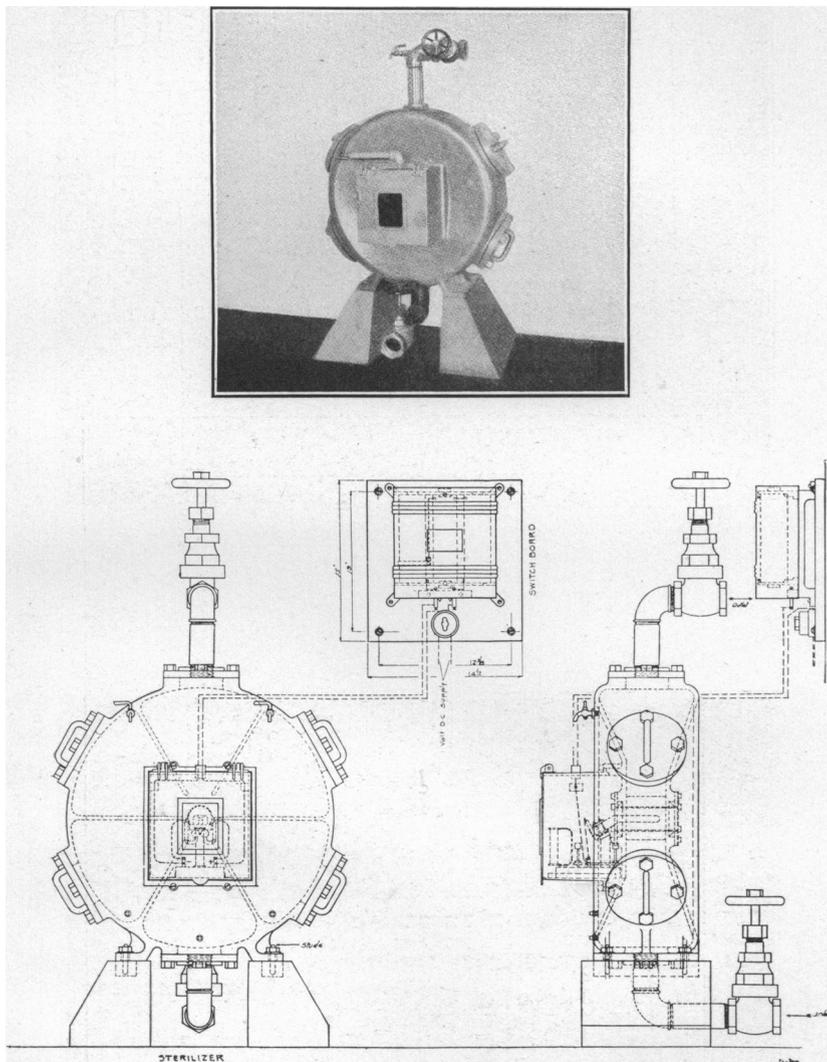


FIG. 9.—PHOTOGRAPH AND DRAWING OF ULTRA-VIOLET LIGHT STERILIZER OF THE PRESSURE TYPE. THIS APPARATUS USES THE PISTOL TYPE OF LAMP.

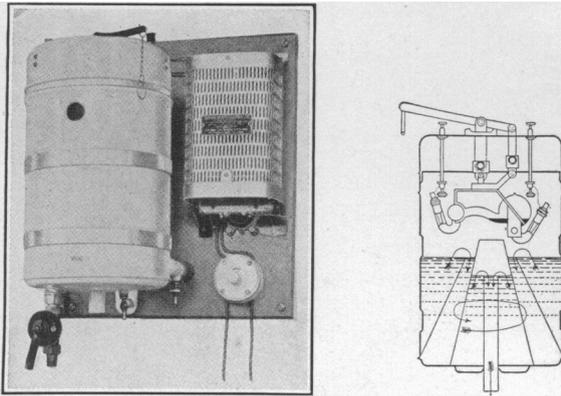


FIG. 10.—PHOTOGRAPH AND DRAWING OF ULTRA-VIOLET LIGHT STERILIZING APPARATUS OF THE GRAVITY TYPE WITH HAND-TILTED LAMP.

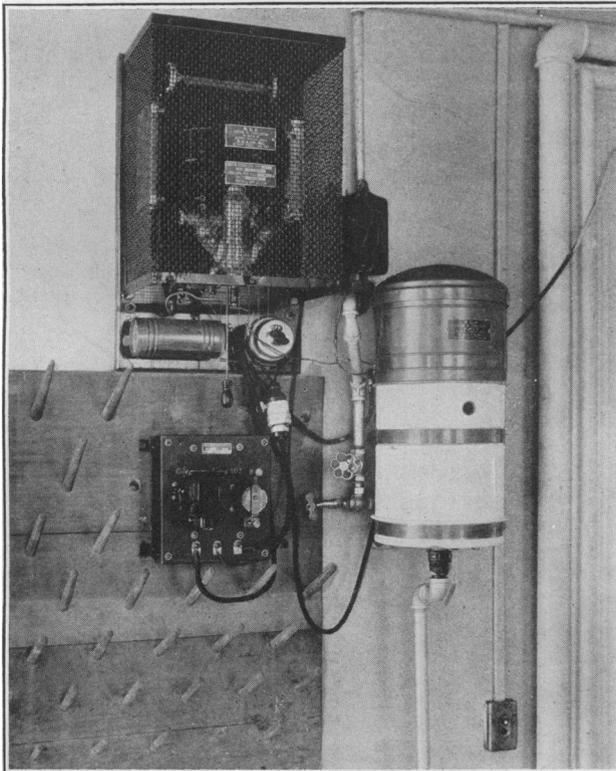


FIG. 11.—PHOTOGRAPH OF ULTRA-VIOLET LIGHT STERILIZING APPARATUS OF THE GRAVITY TYPE EQUIPPED WITH AUTOMATIC TILTED LAMP AND WITH SOLENOID-OPERATED WATER VALVE SO ARRANGED THAT NO WATER CAN PASS THE APPARATUS UNLESS THE CURRENT IS ON AND THE LAMP AT ITS MAXIMUM INTENSITY.

through its axis and containing baffle plates so arranged as to spread the water in a thin film while passing through the ultra-violet field. (See figs. 7 and 8.) The ultra-violet lamp in use during the summer of 1915 was a quartz lamp of the "pistol" type, which was inserted on the inside of the quartz tube, as shown by the accompanying photograph and diagrammatic sketch of the apparatus. (See figs. 7, 8, and 9.) In the gravity type of apparatus the lamp is suspended above a baffled treatment chamber, where the water is exposed in a thin film twice during its passage by the lamp. The gravity apparatus had only a capacity of about 100 gallons an hour, which is considerably below the maximum amount needed on most lake vessels, and as result it was used solely for filling water bottles, pitchers, etc. (See fig. 10.) The pressure apparatus, on the other hand, was rated either at 200 or 1,000 gallons an hour, and the water was treated while under pressure on its way to the distribution system. There were a great many defects in the apparatus in use. In the first place, on all vessels except one the lamp was operated at 110 volts. It is of doubtful possibility to obtain a sufficient intensity of ultra-violet rays at this voltage. In the second place, a sudden fluctuation in voltage of 5 per cent would put out the lamp, the water in the meantime continuing to flow. The last three pressure apparatuses installed, however, contained an attachment for automatically re-lighting the lamp when the voltage resumed its normal intensity.

This feature of the light going out, with a fluctuation of voltage, is an extremely important one, especially aboard ship. A great many of the vessels do not have an excess in generator capacity, and as a result, throwing in or out of any large amount of current will cause a fluctuation. This is sometimes caused by turning on the searchlight or in operating the wireless. The lamps would also go out when generators were shifted, as is ordinarily done when the vessel comes into port. Another objection to the apparatus is that the lamps are extremely delicate, and unless handled very carefully, will break, and thus put the entire equipment out of commission. It is essential when using ultra-violet rays to have the water clear, as any slight turbidity will considerably reduce their efficiency. due to the fact that a certain number of the bacteria present in the water will be protected by the shadow caused by minutely suspended matter. It is thus necessary to filter water before passing it to the sterilizer in order to remove all turbidity. The filters used in this connection were of the small pressure rapid sand type. As mentioned above, these filters occasionally allow a turbid water to pass. There is a tendency, especially with a hard water, such as the lake waters, for a certain amount of mineral salts to deposit on the quartz tube, such deposits rendering the tube more or less opaque to ultra-violet rays, hence lowering the efficiency of the lamp. Another

objection to the apparatus was that the lamp did not reach its maximum efficiency for 5 or 10 minutes after being started, although the water was passing continuously. This is due to the fact that mercury vapor lamps do not obtain maximum efficiency until they have burned long enough to become well heated.

The ultra-violet type of sterilizing apparatus early attracted our attention. The results of laboratory examinations demonstrated that the apparatus in the form described was inefficient. The company manufacturing the apparatus at once set to work to remedy the obvious defects. They have equipped a new type of lamp with an automatic device for relighting whenever it goes out because of breaks in the current. It is claimed that this new lamp emits a higher per cent of ultra-violet rays, and that it will stand a much greater fluctuation in voltage than the old type without going out. The company has also developed an arrangement whereby the water will be shut off automatically when the lamp is out and remain so until it is relighted and regains its point of maximum efficiency, when the water is again started automatically. (See fig. 11.)

Chlorine disinfection.—The water supply of five vessels was treated with calcium hypochlorite, a small dose of a solution of this chemical being added to the storage tank each time it was filled. Calcium hypochlorite, a very efficient sterilizing agent, when properly administered, is not to be recommended on vessels for the reason that it depends for its constant efficiency upon some person to correctly proportion the dosage added to the tanks each time they are filled. On one of the vessels using this chemical the water, at the time of inspection, had an extremely strong chlorinous taste. This indicated an overdose, and was evidence that there was no close control of the amount added. This method is further open to the criticism that its uniform efficiency rests entirely upon human agency, which can never be wholly dependable.

There was installed on one vessel, late in the season, an apparatus for treating the water with liquid chlorine. This appliance did not actually add the chlorine gas to the water, but used it for making up a strong solution of chlorine water. The chlorine gas was passed from a cylinder of liquid chlorine into a large vertical hard-rubber cylinder, displacing water, thus making it possible to obtain a measured amount. This hard-rubber cylinder was connected to a larger cast-iron cylinder, similar in form to a small pressure filter. After the chlorine gas had filled the hard-rubber cylinder, water was turned in at the top and sprayed down through the gas, the water passing out into the cast-iron container. By the time the cast-iron cylinder filled with water, the gas in the hard-rubber cylinder had entirely gone into solution. The water to be treated, after passing a small pressure rapid sand filter, was carried to

the chlorine apparatus, where a constriction was placed in the pipe. Connections between the chlorine water tank and the pipe line were so made that when there was a flow of water in the water pipe there would be a slight proportional shunt feed into the top of the chlorine water tank, causing a displacement, and hence the feeding of a proportional amount of the chlorine water into the pipe line. It was planned that the water displacing the chlorine would remain on top of the chlorine water without mixing to any perceptible degree. As a matter of fact, however, the vibrations and rolling of the vessel were such as to cause mixing, so that the chlorine solution lost strength continuously while in operation.

There are a number of objections to the above-described apparatus. To charge the cylinder with chlorine water requires the opening and closing, in correct sequence, of about 15 valves. This means that the operator must be thoroughly trained before he can be trusted to correctly manipulate the complicated mechanism. The fact that the chlorine solution is constantly becoming diluted is another objection, as it requires careful chemical tests on the treated water to know just when this solution becomes so weak as to be inefficient. Any apparatus for water treatment on board a vessel which requires constant supervision is bound sooner or later to give bad results. The engineer's first duty is to run his engines. The water supply is a secondary consideration. In case of some unexpected trouble in the engine room the water-purification apparatus will be neglected; also any apparatus requiring a considerable amount of skill for its operation is liable to be put out of commission in case of accident to the engineer.

Sterilization by heat from steam jet.—There were five vessels which treated the drinking water by heating with a steam jet. This scheme was devised by the Detroit city board of health in connection with their study of drinking water on vessels entering Detroit.

To operate this apparatus, water was pumped from the sea cock by means of an ordinary steam-boiler injector, and when discharged from the injector it was raised to a temperature of about 160° F. After leaving the injector, a steam jet was added to the line, further increasing the temperature to about 230° F. In this discharge line was placed a thermometer, and upon starting, the water was allowed to run to waste until the last-mentioned temperature was reached, at which time the waste line was closed and the water passed through several hundred feet of pipe placed inside a cylindrical tank through which cold water was circulated. This cooling tank reduced the temperature to about 130° F. From the cooling tank the water was run into the drinking-water storage tanks.

This apparatus, while able to produce good results under careful management, was liable to be mishandled. In the first place, it depended entirely upon the observation of the engineer as to the reading of the thermometer in order to be certain that no water reached the storage tanks which had not been heated to the above-named temperature, and as the water after heating was passed immediately to the cooling tank, it was not held at the high temperature except for comparatively a few seconds.

With a few modifications, the apparatus could be made "fool proof" and automatic in its operation. These improvements consist in adding a supplementary tank, in which the hot water could be stored for perhaps five minutes before entering the cooling tank. It would also be possible to install a thermostat just beyond this retention tank, which would automatically control a waste valve and a valve leading into the cooling tank, so that unless the water leaving

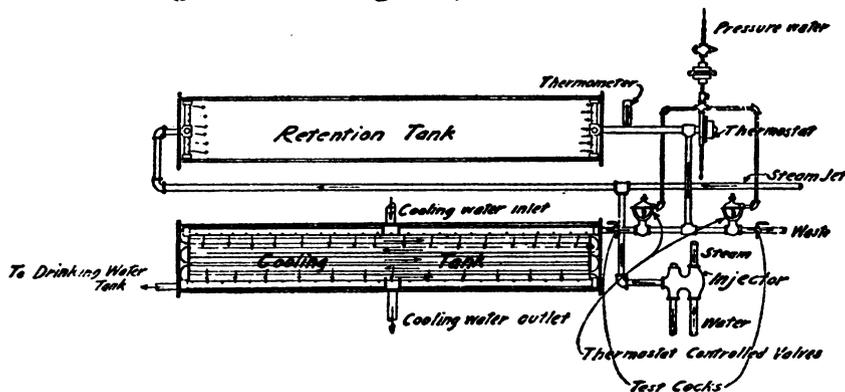


FIG. 12.—Drawing of apparatus for disinfecting water by steam jet, equipped with devices to make it automatic and foolproof in operation.

the retention tank was up to the required temperature, it would run to waste. Figure 12 shows this apparatus with the suggested modifications. As in use during the past summer the retention tank was omitted, as was the thermostat, and in place of the thermostat-controlled valves hand-operated valves were used.

Results of bacteriological examinations.—All examinations made at the laboratory were strictly in accordance with the Treasury Department bacteriological standard of purity for drinking water for interstate common carriers, this maximum limit of permissible bacteriological impurity being:

1. The total number of bacteria developing on standard agar plates, incubated 24 hours at 37° C., shall not exceed 100 per cubic centimeter: *Provided*, That the estimate shall be made from not less than two plates, showing such numbers and distribution of colonies as to indicate that the estimate is reliable and accurate.
2. Not more than one out of five 10 c. c. portions of any sample examined shall show the presence of organisms of the *Bacillus coli* group when tested as follows:

(a) Five 10 c. c. portions of each sample tested shall be planted, each in a fermentation tube containing not less than 30 c. c. of lactose peptone broth. These shall be incubated 48 hours at 37° C. and observed to note gas formation.

(b) From each tube showing gas, more than 5 per cent of the closed arm of fermentation tube, plates shall be made after 48 hours' incubation, upon lactose litmus agar or Endo's medium.

(c) When plate colonies resembling *B. coli* develop upon either of these plate media within 24 hours, a well-isolated characteristic colony shall be fished and transplanted into a lactose broth fermentation tube, which shall be incubated at 37° C. for 48 hours.

For the purposes of enforcing any regulations which may be based upon these recommendations the following may be considered sufficient evidence of the presence of organisms of the *Bacillus coli* group:

Formation of gas in fermentation tube containing original sample of water (a).

Development of acid-forming colonies on lactose litmus agar plates or bright red colonies on Endo's medium plates when plates are prepared as directed above under (b).

The formation of gas, occupying 10 per cent or more of closed arm of fermentation tube, in lactose peptone broth fermentation tube inoculated with colony fished from 24-hour lactose litmus agar or Endo's medium plate.

These steps are selected with reference to demonstrating the presence in the samples examined of aerobic lactose fermenting organisms.

3. It is recommended, as a routine procedure, that in addition to five 10 c. c. portions one 1 c. c. portion and one 0.1 c. c. portion of each sample examined be planted in a lactose peptone broth fermentation tube in order to demonstrate more fully the extent of pollution in grossly polluted samples.

4. It is recommended that in the above-designated tests the culture media and methods used shall be in accordance with the specifications of the committee on standard methods of water analysis of the American Public Health Association, as set forth in "Standard Methods of Water Analysis" (A. P. H. A., 1912).

A total of 961 samples was collected and examined during the past summer from 74 different passenger vessels, and 68 samples were collected and examined from 33 different freight vessels. These samples were for the most part collected at Chicago and examined as soon as they reached the laboratory. Samples were also collected from vessels at Buffalo, Cleveland, Detroit, and Milwaukee, and shipped on ice by express to the laboratory. These latter samples generally reached the laboratory within 24 hours after shipment, although in some cases it required 48 hours. Most of these outside samples were collected at Detroit, where very material aid was rendered by the local board of health which had already inspected and examined the water supplies of all vessels running out of Detroit.

A series of vessels equipped with various types of purification apparatus were selected for intensive study. From these vessels, a great many samples were collected at various points in the purification systems in order to determine the efficiency of the apparatus.

The following table outlines the results obtained on both passenger and freight boats:

Results of analyses of tap samples from passenger and freight boats.

	Samples examined for total bacteria and B. coli.			Samples examined for total bacteria.			Samples examined for B. coli.		
	Total number.	Number conforming.	Per cent conforming.	Total number.	Number conforming.	Per cent conforming.	Total number.	Number conforming.	Per cent conforming.
Passenger boats:									
Without treatment.....	156	35	22.4	156	55	35.2	163	78	47.8
With treatment.....	521	206	39.6	524	338	64.5	550	322	58.5
Rapid sand filters only..	213	83	38.9	211	144	68.2	223	118	52.8
Electric rapid sand filters.....	13	5	38.5	13	7	53.7	13	10	76.9
Ultra-violet rays.....	240	74	30.8	241	137	56.8	256	139	54.3
Heat treatment.....	13	9	69.2	16	12	75.0	12	12	100.0
Calcium hypochlorite.....	5	3	60.0	5	3	60.0	7	7	100.0
Liquid chlorine.....	38	32	84.2	38	35	92.2	39	36	92.3
Freight boats:									
Without treatment.....	57	11	19.3	57	22	38.5	60	28	46.7

This table, which includes only tap samples, shows that the methods of purification in use at the present time are very inefficient, less than 40 per cent of the samples conforming to the standard. There is but a slight difference between the results on passenger boats having no treatment and freight boats, which are without treatment, 22.4 per cent of the samples from passenger boats conforming to the standard, and 19.3 per cent of the samples from freight boats conforming.

When the results of the samples receiving treatment are separated according to the form of treatment, it is seen that the two methods most commonly used give very inefficient results. Samples treated in rapid sand filters conform only 38.9 per cent of the time, and samples treated by ultra-violet rays in connection with rapid sand filters conform only 31 per cent of the time. This drop in efficiency in connection with the ultra-violet apparatus was probably due to the fact that vessels so equipped ran in worse water than those having filters only.

Only a comparatively few samples from boats using heat treatment were taken, but these show that 69.2 per cent of the time the samples conformed to the standard. All the samples from these boats conformed according to *B. coli*, the failure to conform being due to high counts. As pointed out under the discussion of this type of apparatus, the high counts were undoubtedly due to the fact that the water after treatment was passed into the storage tanks at a temperature above that of the body, and hence there was multiplication of the 37 degree bacteria. The *B. coli* were killed by the treatment.

Those boats using hypochlorite for disinfection conformed 60 per cent of the time, but as only five samples were collected from boats

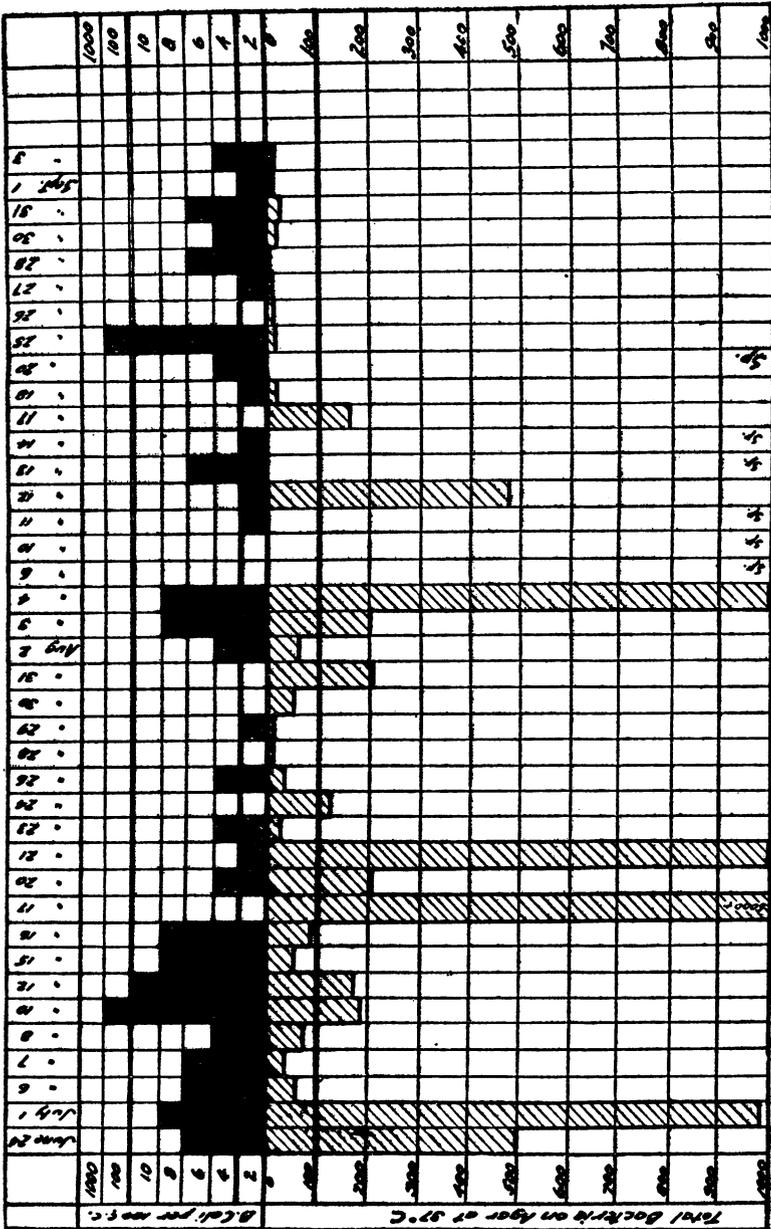


FIG. 13.—Graphic chart showing results of analyses of tap samples from steamship equipped with ultra-violet ray apparatus.

of this type, no reliable conclusion can be drawn as to the constant efficiency of this treatment.

The samples from the one vessel using liquid chlorine show a high efficiency, 84.2 per cent of the samples conforming to the standard. The apparatus on this boat, however, was broken during a high sea, which shows that it is not dependable. Other objections have been noted heretofore.

In order to indicate the variations from day to day in samples from different boats a few graphic charts are shown, illustrating the various types of vessel.

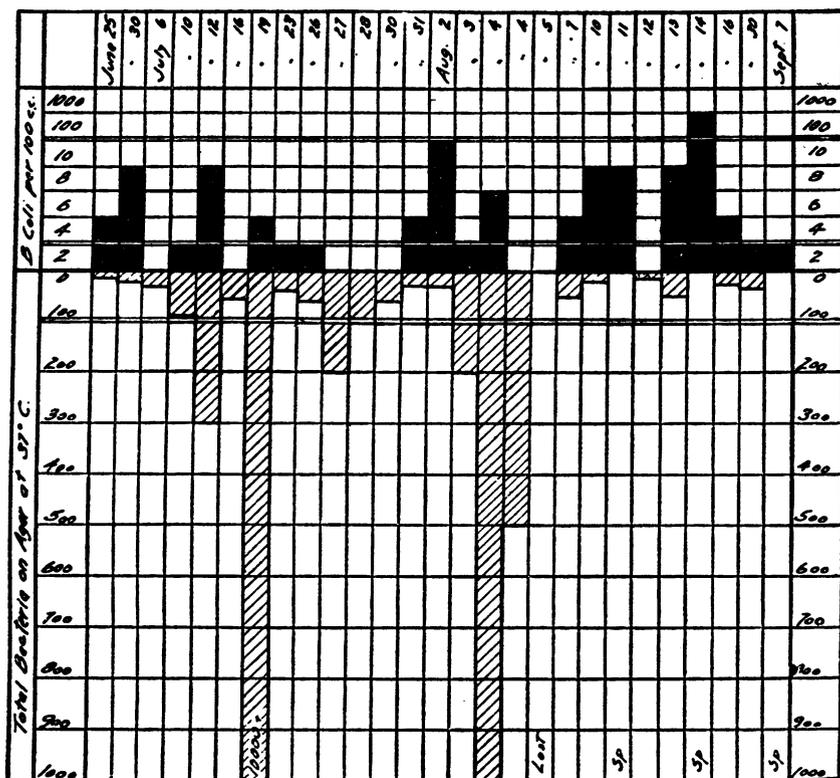


Fig. 14.—Graphic chart showing results of analyses of tap samples from steamship equipped with rapid sand filter.

Figure 13 represents the results of tap samples from a vessel equipped with a 220-volt ultra-violet lamp apparatus. Special care was given this apparatus and an attempt was made to obtain a water supply at the most favorable point on the vessel's route. Nevertheless, poor results were obtained as shown in the chart.

Figure 14 represents the analyses of tap samples from a vessel equipped with a rapid sand filter.

Figure 15 represents the results from three vessels which treated the water with small rapid sand filters. The charts speak for themselves.

A study of the results from different vessels in connection with the type of sea cock and arrangement used for taking on water shows that the arrangement has a very small effect upon the character of water obtained. It is, however, hard to believe that fairly good

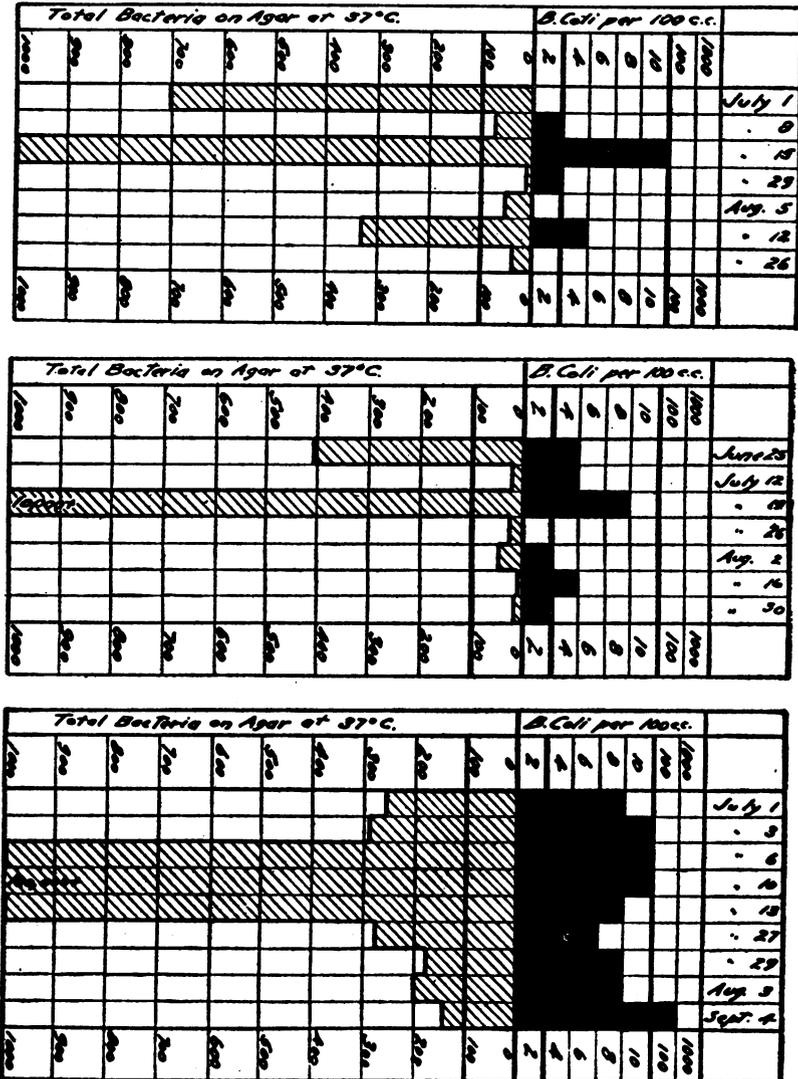


FIG. 15.—Graphic chart showing results of analyses of tap samples from steamships equipped with pressure sand filters.

results were recorded from vessels that obtained the drinking water supply through such piping systems as shown in figures 5 and 6. On these vessels the water is pumped from the sea cock through 50 or 60 feet of 6 or 8 inch piping. That fecal matter is frequently awash

in these pipes can not be denied. Such a condition is intolerable and demands prompt correction.

In order to eliminate the probability of contamination through leaky valves, other vessels used a separate sea cock and special pump for filling the tanks, taking the added precaution to place a valve between the pump and the sea cock, and a drip pipe between this valve and the sea cock. When the pump was not taking water from the lake, the valve and sea cock were closed and the drip pipe was opened, thus allowing any leakage to flow to waste. This was the best piping system that could be devised, but, nevertheless, it gave no better results than the ordinary type.

One vessel, operating between Buffalo and Chicago, obtained its water supply by gravity from a sea cock located in the extreme bow of the vessel. The tank of this boat was of rectangular shape, built of steel plates. Probably more care was paid to the collection of the drinking-water supply on this vessel than on any other carrier operating on the Great Lakes. The water-supply problem was under the direction of a bacteriologist in Buffalo, who furnished the ship's officers with a chart showing the best location on the vessel's route for obtaining a safe drinking water. The actual taking on of the water was done under the direction of the third officer, who kept the key to the valve in his room. An accurate log was kept of the time and place where water was taken, and samples of this water were collected at the time and returned to Buffalo for analysis. (See fig. 16.)

Yet, notwithstanding all of the above-described precautions, only 50 per cent of the samples taken from this vessel conform to the standard.

A study of the results according to the routes of the vessels, shows, as would be expected, that those vessels traveling in contaminated water and docking at polluted ports, had a considerably higher degree of pollution than vessels running in better water.

Inspections were made and samples collected from two vessels operating on the Illinois River. This river is badly polluted, inasmuch as it receives from the Chicago Drainage Canal all of the sewage of the city of Chicago. Both of the vessels were equipped with small filters, which were very inefficient. An attempt was made to obtain part of their supply from shore, but the methods of handling this water were so crude that all samples showed a high degree of contamination. Judging from statements made by owners of these vessels, conditions aboard other river boats are as bad if not worse. There is on record a severe epidemic of typhoid fever among the crew and passengers of a Mississippi River boat.

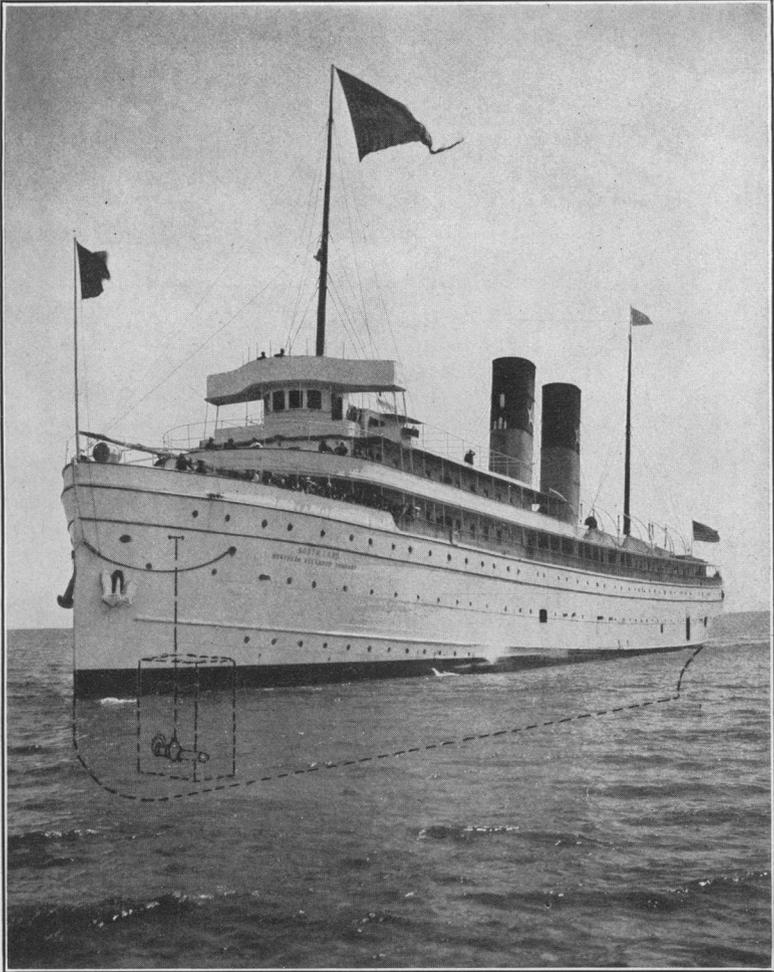


FIG. 16.—PHOTOGRAPH OF STEAMSHIP, SHOWING BY DOTTED LINES ARRANGEMENT FOR FILLING DRINKING-WATER TANK.

Conclusions.

The types of purification apparatus in use on vessels of the Great Lakes at the present time are woefully inefficient. There is not a method in use that can be depended upon to deliver a safe water at all times.

The route and docking place of the vessel play some part in the character of the water supply.

It is impossible, without treatment, to obtain a drinking water for boats directly from the lakes through the present piping systems that will at all times conform to the Treasury Department standard.

Therefore, to comply with the law, it will be necessary for every vessel on the Great Lakes to install a method of water purification which shall be so constructed that it can not under any conceivable circumstances deliver a water which will not conform to the Government requirements. This will necessitate an apparatus that will be entirely automatic in action and proof against carelessness, indifference, and forgetfulness, as well as dependable in every stress of weather.

In order to enable the transportation companies to meet the above requirement a study has been made of all water purification processes which might be capable of adaptation for use on lake carriers. Many conferences have been had with manufacturers of various types of apparatus, and in several cases experimental plants have been installed at this laboratory for testing.

Undoubtedly, the ideal form of water-purification apparatus which will meet the above requirements is the still. This is the only type of apparatus that does not depend in some way on moving mechanical parts for its efficiency, and hence requires but little care for its successful operation. If the scale is not removed from the heating coil at intervals the capacity will be reduced, but this will not effect in any way the quality of the water. Automatically operated water stills are now on the market which produce bacteriologically pure water. At the present time, stills or evaporators are in use on practically all ocean-going vessels, producing a satisfactory drinking water from salt water. There is, therefore, no reason why these stills are not applicable to lake vessels.

One of the main advantages of the use of a still is the fact that no attention need be paid to the place of taking water.

There are but three disadvantages to stills, and these are not of sanitary significance, namely, (1) the operating cost, (2) the possibility of producing a flat or unpalatable water, (3) the possibility of corrosion of pipes or tanks.

Stills which produce a palatable and satisfactory drinking water have been tested at this laboratory. Any still which is so constructed

that it is impossible for the raw water to gain access in any manner to the distilled water will be satisfactory for use on lake vessels. There is no objection, so far as the Government is concerned, to the use of the condensed heating steam for augmenting the supply of distilled water, the only disadvantage of this being the fact that in some installations there is a chance that offensive tastes or odors may be given to the water.

A rigid investigation has demonstrated that the two following-described methods of purification, viz, heating by steam jet or exposure to ultra-violet rays, are capable of producing a satisfactory water, the constant efficiency of each method, however, depending upon the uninterrupted action of moving mechanical parts. As long as these operate in a normal manner good results can be obtained. This means that closer supervision will need to be paid to the operation of these types of apparatus than to the still.

The scheme heretofore outlined in the body of this report of pumping water by means of a steam injector would also be satisfactory, provided that the modifications mentioned were made part of the apparatus. The equipment should consist of an injector for pumping the water, a steam jet for increasing its temperature, a retention tank, holding about five minutes' supply, a thermostat operating a waste valve and a valve leading into the cooling tank, two telltale cocks for enabling the engineer to see that the apparatus is working properly, a thermometer on the line leading into the cooling tank, and a cooling tank for reducing the temperature of the water to somewhere near that of the lake water. (See fig. 12.) One of the main advantages of this method of water purification is that it would not be expensive to install, and that its method of operation would be understood perfectly by the engineer in charge. With this apparatus it would be necessary for the same care to be used in selecting the place of taking in the water that is now used in order to prevent any possibility of bad tastes or odors.

The company manufacturing the ultra-violet ray outfit has installed at this laboratory three different types of apparatus, and these have been thoroughly tested. The results of these tests show that with the improved form of lamp and with the other attachments which will be described, working in a proper manner, that a water meeting the Government requirements can be produced. Where the ultra-violet rays are used there should be installed a pressure regulator, an orifice incapable of being changed; a pressure rapid sand filter, with an alum shunt feed box for adding coagulant of such a size that it will not need to operate at a greater rate than 3 gallons per square foot of filtering area a minute; a suitable arrangement for passing the water through the field of ultra-violet rays; a mercury vapor quartz lamp, operating at 220 volts; an arrangement for pre-

venting the passage of any water except when the lamp is lighted and at its maximum intensity; a device for automatically lighting the lamp when the current is turned on; a simple method of removing and cleaning the quartz tube; and a closed reserve tank, holding, say, 200 gallons, placed upon an upper deck in order to supply the system when the water is shut off. With an apparatus as specified above, all that it would be necessary for the engineer to do would be to turn on the current and furnish the water; after that the apparatus would operate automatically.

With any of the above approved methods of water purification it is imperative that the equipment be of a sufficient size to meet the maximum load that may be put upon it.

Outside of the above three methods none is known to us which will, under all circumstances, produce a water meeting the Government requirements.

PLAGUE-PREVENTION WORK.

CALIFORNIA.

The following report of plague-prevention work in California for the week ended September 16, 1916, was received from Senior Surg. Pierce of the United States Public Health Service, in charge of the work:

FEDERAL AND COUNTY INSPECTION SERVICE.

(For the enforcement of the law of June 7, 1913.)

Counties.	Number inspected.	Number re-inspected.	Acres inspected.	Acres re-inspected.	Acres treated.		Holes treated.
					Waste balls.	Grain.	
Alameda.....		103		32, 118	10	2, 924	150
Contra Costa.....	5	65	4, 320	31, 499		11, 707	
Stanislaus.....	84	75	34, 360	40, 806	920	12, 342	
Santa Cruz.....		35		5, 044		3, 037	
Merced.....		18	21, 063	9, 420		6, 240	
Monterey ¹	32	16	30, 655	8, 855		8, 885	6, 720
San Benito.....	45	32	36, 657	23, 481	400	33, 010	1, 000
Santa Clara ²	36	2	12, 980	700		755	
San Mateo.....	13		3, 939				
Total.....	247	316	143, 973	151, 923	1, 330	78, 900	7, 870

¹ Nine hundred acres treated with hose and funnel.

² Sixteen miles railroad rights-of-way inspected and treated with grain.

RATS COLLECTED AND EXAMINED FOR PLAGUE.

Cities.	Collected.	Examined.	Infected.
Oakland.....	20	20	None.
Richmond.....	24	24	None.
Antioch.....	64	64	None.
Total.....	108	108	None.

RECORD OF PLAGUE INFECTION.

Places in California.	Date of last case of human plague.	Date of last case of rat plague.	Date of last case of squirrel plague.	Total number rodents found infected since May, 1907.
Cities:				
San Francisco.....	Jan. 30, 1908	Oct. 23, 1908	(1)	398 rats.
Oakland.....	Aug. 9, 1911	Dec. 1, 1908	(1)	126 rats.
Berkeley.....	Aug. 28, 1907	(1)	(1)	None.
Los Angeles.....	Aug. 11, 1908	(1)	Aug. 21, 1908	1 squirrel.
Counties:				
Alameda (exclusive of Oakland and Berkeley).....	Sept. 21, 1909	Oct. 17, 1909	June 23, 1916	293 squirrels, 1 wood rat.
Contra Costa.....	July 13, 1915	(1)	June 28, 1916	1,623 squirrels.
Fresno.....	(1)	(1)	Oct. 27, 1911	1 squirrel.
Merced.....	(1)	(1)	May 12, 1916	7 squirrels.
Monterey.....	(1)	(1)	May 27, 1916	38 squirrels.
San Benito.....	June 4, 1913	(1)	July 1, 1916	72 squirrels.
San Joaquin.....	Sept. 18, 1911	(1)	Aug. 26, 1911	18 squirrels.
Santa Clara.....	Aug. 31, 1910	(1)	June 21, 1916	32 squirrels.
San Luis Obispo.....	(1)	(1)	Jan. 29, 1910	1 squirrel.
Santa Cruz.....	(1)	(1)	May 30, 1916	5 squirrels.
Stanislaus.....	(1)	(1)	June 2, 1911	18 squirrels.
San Mateo.....	(1)	(1)	June 21, 1916	1 squirrel.

¹ None.

The work is being carried on in the following named counties: Alameda, Contra Costa, Stanislaus, Monterey, San Benito, Santa Cruz, Merced, Santa Clara, and San Mateo.

OPERATIONS ON THE WATER FRONT.		OPERATIONS ON THE WATER FRONT—continued.	
Number of vessels inspected for rat guards.....	16	Bait used on water front and vessels. Bacon (pounds).....	6
Number of reinspections made on vessels.....	3	Amount of bread used in poisoning water front (loaves).....	12
Rats trapped on wharves and water front.....	39	Number of pounds of poison used on water front.....	4
Rats trapped on vessels.....	18	Poisons placed within the Panama-Pacific International Exposition grounds (pieces).....	36,000
Number of traps set on wharves and water front.....	267		
Number of traps set on vessels.....	106		
Number of vessels trapped on.....	16		
Poisons placed on water front (pieces).....	3,600		

The following is a record of municipal work performed under the supervision of the United States Public Health Service.

COOPERATIVE MUNICIPAL WORK.		WORK DONE ON OLD BUILDINGS.	
Number of premises inspected.....	765	Wooden floors removed.....	10
Number of nuisances abated.....	90	Number of yards and passageways, plank-ing removed.....	2
Number of rats trapped.....	57	Cubic feet new foundation walls installed.....	9,430
Number of rats examined.....	35	Concrete floors installed (square feet, 8,000).....	8
Number of poisons placed.....	56,400	Number of basements concreted (square feet, 17,925).....	26
Number of garbage cans stamped approved.....	800	Yards and passageways, etc., concreted (square feet, 6,395).....	16
Rats identified:		Total area concrete laid (square feet).....	32,320
Mus norvegicus, 23.		Number of floors rat-proofed with wire cloth (square feet, 1,125).....	2
Mus rattus, 10.		Buildings razed.....	4
Mus alexandrinus, 21.			

LOUISIANA—NEW ORLEANS—PLAGUE ERADICATION.

The following report of plague-eradication work at New Orleans for the week ended September 23, 1916, was received from Passed Asst. Surg. Simpson, of the United States Public Health Service, in charge of the work:

OUTGOING QUARANTINE.	
Number of vessels fumigated with cyanide gas.....	15
Pounds of cyanide used in cyanide gas fumigation.....	1,128
Pints of sulphuric acid used in cyanide gas fumigation.....	1,688
Clean bills of health issued.....	33
Foul bills of health issued.....	2

FIELD OPERATIONS.	
Number of rodents trapped.....	10,221
Number of premises inspected.....	7,455
Notices served.....	551
Number of garbage cans installed.....	22

BUILDINGS RAT PROOFED.	
By elevation.....	139
By marginal concrete wall.....	183
By concrete floor and wall.....	142
By minor repairs.....	256
Total buildings rat proofed.....	720
Square yards of concrete laid.....	5,319
Number of premises, planking, and shed flooring removed.....	92
Number of buildings demolished.....	93
Total buildings rat proofed to date (abated).....	127,163

LABORATORY OPERATIONS.	
Rodents received by species:	
<i>Mus rattus</i>	260
<i>Mus norvegicus</i>	700
<i>Mus alexandrinus</i>	182

LABORATORY OPERATIONS—continued.	
Rodents received by species—Continued.	
<i>Mus musculus</i>	8,836
Wood rats.....	116
Muskrats.....	3
Putrid.....	186
Total rodents received at laboratory.....	10,283
Rodents examined.....	1,767
Number of rats suspected of plague ¹	29
Plague rats confirmed.....	1

PLAGUE RAT.
Case No. 335.
Found at Florida Walk and Music Dump.
Captured August 21, 1916.
Diagnosis confirmed September 18, 1916.

PLAGUE STATUS TO SEPTEMBER 23, 1916.	
Total number of rodents captured to September 23.....	853,417
Total number of rodents examined to September 23.....	383,776
Total cases of rodent plague to September 23, by species:	
<i>Mus musculus</i>	6
<i>Mus rattus</i>	20
<i>Mus alexandrinus</i>	16
<i>Mus norvegicus</i>	293
Total rodent cases to September 23, 1916.....	335

WASHINGTON—SEATTLE—PLAGUE ERADICATION.

The following report of plague-eradication work at Seattle for the week ended September 16, 1916, was received from Passed Asst. Surg. Krulish, in charge of the work:

RAT PROOFING.	
New buildings inspected.....	18
New buildings reinspected.....	36
Basements concreted, new buildings (square feet, 5,250).....	7
Floors concreted, new buildings (square feet, 14,175).....	9
Yards, etc., concreted, new buildings (square feet, 1,450).....	5
Sidewalks concreted (square feet).....	12,475
Total concrete laid, new structures (square feet).....	33,350
New buildings elevated.....	4
New premises rat proofed, concrete.....	16
Old buildings inspected.....	5
Premises rat proofed, concrete, old buildings.....	3
Floors concreted, old buildings (square feet, 12,250).....	3
Wooden floors removed, old buildings.....	5
Buildings razed.....	2

LABORATORY AND RODENT OPERATIONS.	
Dead rodents received.....	19
Rodents trapped and killed.....	266
Rodents recovered after fumigation.....	24
Total.....	309
Rodents examined for plague infection.....	206
Rodents proven plague infected.....	None.
Poison distributed (pounds).....	21
Bodies examined for plague infection.....	6
Bodies proven plague infected.....	None.
CLASSIFICATION OF RODENTS.	
<i>Mus rattus</i>	37
<i>Mus alexandrinus</i>	52
<i>Mus norvegicus</i>	162
<i>Mus musculus</i>	58

WATER FRONT.	
Vessels inspected and histories recorded.....	16
Vessels fumigated.....	3
Sulphur used, pounds.....	4,700

¹ Indicates the number of rodents, the tissues of which were inoculated into guinea pigs. Most of them showed on necropsy only evidence of recent inflammatory process, practically none presented gross lesions characteristic of plague infection.

WATER FRONT—continued.

New rat guards installed.....	7
Defective rat guards repaired.....	28
Fumigation certificates issued.....	3
Port sanitary statements issued.....	37
The usual day and night patrol was maintained to enforce rat guarding and fending.	

MISCELLANEOUS WORK.

Letters sent in re rat complaints.....	4
Rat proofing notices sent contractors, new buildings.....	11
Railway coach disinfected.....	1

RODENTS EXAMINED IN EVERETT.

Mus norvegicus trapped.....	69
Mus norvegicus found dead.....	2
Mus musculus trapped.....	3
Total.....	74

RODENTS EXAMINED IN EVERETT—continued.

Rodents examined for plague infection.....	70
Rodents proved plague infected.....	0

RAT-PROOFING OPERATIONS IN EVERETT.

New buildings inspected.....	2
New buildings reinspected.....	8
New buildings, concrete foundations.....	1
New buildings elevated.....	2
New buildings, basements concreted (square feet, 1,500).....	1
New buildings, floors concreted (square feet, 812).....	1
Total concrete laid (square feet).....	2,312

RODENTS EXAMINED IN TACOMA.

Mus norvegicus trapped.....	118
Rodents examined for plague infection.....	70
Rodents proven plague infected.....	0

HAWAII—PLAGUE PREVENTION.

The following reports of plague-prevention work in Hawaii were received from Surg. Trotter of the United States Public Health Service:

Honolulu.

WEEK ENDED SEPT. 16, 1916.

Total rats and mongoose taken.....	296	Average number of traps set daily.....	984
Rats trapped.....	295	Cost per rat destroyed.....	26 cents.
Mongoose trapped.....	1	Last case rat plague Aiea, 9 miles from Honolulu, Apr. 12, 1910.	
Examined microscopically.....	237	Last case human plague, Honolulu, July 12, 1910.	
Examined macroscopically.....	59	Last case rat plague, Paauhau, Hawaii, Jan. 18, 1916.	
Showing plague infection.....	None.	Last case human plague, Paauhau Plantation, Hawaii, Dec. 16, 1915.	
Classification of rats trapped:			
Mus alexandrinus.....	121		
Mus musculus.....	118		
Mus norvegicus.....	45		
Mus rattus.....	11		

Hilo.

WEEK ENDED SEPT. 2, 1916.

Number of rats and mongoose taken.....	2,461	Classification of rats trapped and found dead:	Mus norvegicus.....	503
Number of rats trapped.....	2,402		Mus alexandrinus.....	341
Number of mongooses taken.....	59		Mus rattus.....	532
Number of rats and mongoose examined macroscopically.....	2,461		Mus musculus.....	1,026
Number of rats and mongoose plague infected.....	None.			

WEEK ENDED SEPT. 9, 1916.

Number of rats and mongoose received at laboratory.....	2,467	Classification of rats trapped and found dead:	Mus norvegicus.....	500
Number of rats trapped.....	2,416		Mus alexandrinus.....	333
Number of rats found dead.....	9		Mus rattus.....	621
Number of mongooses taken.....	42		Mus musculus.....	971
Number of rats and mongoose examined macroscopically.....	2,467		Last case of rat plague, Paauhau Sugar Co., Jan. 18, 1916.	
Number of rats and mongoose plague infected.....	None.	Last case of human plague, Paauhau Sugar Co., Dec. 16, 1915.		

PREVALENCE OF DISEASE.

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring.

UNITED STATES.

ANTHRAX.

Massachusetts.

During the month of September, 1916, one case of anthrax was reported in Massachusetts.

CEREBROSPINAL MENINGITIS.

Massachusetts Report for September, 1916.

Place.	New cases reported.	Place.	New cases reported.
Massachusetts:		Massachusetts—Continued.	
Berkshire County—		Suffolk County—	
North Adams.....	1	Boston.....	7
Bristol County—		Worcester County—	
Fall River.....	1	Worcester.....	1
Essex County—		Total.....	16
Haverhill.....	1		
Franklin County—			
Greenfield.....	1		
Middlesex County—			
Everett.....	1		
Lowell.....	3		

State Reports for August, 1916.

Place.	New cases reported.	Place.	New cases reported.
Kansas:		Virginia—Continued.	
Coffey County.....	1	Henrico County—	
Harper County.....	1	Richmond.....	1
Leavenworth County—		Loudoun County.....	1
Leavenworth.....	1	Louisa County.....	1
Sedgewick County—		Madison County.....	2
Wichita.....	1	Middlesex County.....	1
Total.....	4	Montgomery County.....	1
		Roanoke County.....	1
Virginia:		Rockbridge County.....	1
Caroline County.....	1	Washington County.....	2
Gloucester County.....	1	Wise County.....	2
Halifax County.....	1	Total.....	15

CEREBROSPINAL MENINGITIS—Continued.
City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Boston, Mass.....		1	Milwaukee, Wis.....	2	2
Chicago, Ill.....	3	2	Nashville, Tenn.....	1	1
Cleveland, Ohio.....	1		New York, N. Y.....	2	2
Haverhill, Mass.....	1		Philadelphia, Pa.....	1	
Kokomo, Ind.....	1		St. Louis, Mo.....	1	
Los Angeles, Cal.....		1			

DENGUE.

Texas.

The secretary of the State board of health of Texas reported October 6 that 523 cases of dengue had been notified in Texas, 13 counties having reported cases.

DIPHThERIA.

Georgia—Rome.

Asst. Surg. Slaughter reported October 8 that 11 clinical cases of diphtheria and 52 carriers had been notified among students and teachers at Georgia school for the deaf, located at Cave Springs, Ga. This institution has an enrollment of about 200.

See also Diphtheria, measles, scarlet fever, and tuberculosis, page 2885.

ERYSIPELAS.

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Buffalo, N. Y.....	1		New York, N. Y.....		1
Butte, Mont.....	1		Philadelphia, Pa.....	2	2
Chicago, Ill.....	4		Pittsburgh, Pa.....	7	1
Cleveland, Ohio.....	2	1	Portland, Oreg.....	1	
Detroit, Mich.....	3		Richmond, Va.....		1
Flint, Mich.....	1	1	Sacramento, Cal.....	1	
Hartford, Conn.....	1		St. Louis, Mo.....	1	
Lawrence, Mass.....		1	St. Paul, Minn.....	1	
Los Angeles, Cal.....	1		San Francisco, Cal.....	2	
Milwaukee, Wis.....	1		Toledo, Ohio.....	1	
Nashville, Tenn.....	1				

MALARIA.

Massachusetts Report for September, 1916.

Place.	New cases reported.	Place.	New cases reported.
Massachusetts:		Massachusetts—Continued.	
Bristol County—		Norfolk County—	
Fall River.....	1	Dedham.....	1
North Attleboro.....	2	Suffolk County—	
Essex County—		Boston.....	6
Haverhill.....	1	Chelsea.....	1
Middlesex County—		Worcester County—	
Cambridge.....	1	Uxbridge.....	3
Everett.....	1	Worcester.....	1
Newton.....	1		
		Total.....	19

MALARIA—Continued.

State Reports for August, 1916.

Place.	New cases reported.	Place.	New cases reported.
Kansas:		Virginia—Continued.	
Butler County.....	2	Lancaster County.....	21
Chautauqua County.....	4	Lee County.....	5
Sumner County.....	2	Loudoun County.....	6
Wilson County.....	1	Louisa County.....	13
Total.....	9	Lunenburg County.....	9
		Mathews County.....	7
Virginia:		Mecklenburg County.....	46
Accomac County.....	18	Middlesex County.....	29
Albemarle County.....	6	Montgomery County.....	1
Alexandria County.....	6	Nansemond County.....	153
Alexandria.....	5	Nelson County.....	5
Alleghany County.....	1	New Kent County.....	14
Amelia County.....	39	Norfolk County.....	238
Amherst County.....	3	Portsmouth.....	10
Augusta County.....	1	Northampton County.....	41
Bedford County.....	6	Northumberland County.....	40
Botetourt County.....	6	Nottoway County.....	9
Brunswick County.....	34	Pittsylvania County.....	80
Buckingham County.....	1	Powhatan County.....	46
Campbell County.....	113	Prince Anne County.....	53
Charles City County.....	12	Prince Edward County.....	27
Charlotte County.....	28	Prince George County.....	19
Chesterfield County.....	27	Prince William.....	8
Cumberland County.....	22	Pulaski County.....	1
Dinwiddie County.....	33	Richmond County.....	28
Elizabeth City County.....	7	Roanoke County.....	4
Essex County.....	19	Rockbridge County.....	1
Fairfax County.....	19	Rockingham County.....	1
Fauquier County.....	3	Russell County.....	1
Flovanna County.....	2	Scott County.....	1
Franklin County.....	3	Shenandoah County.....	1
Giles County.....	3	Southampton County.....	87
Gloucester County.....	47	Spotsylvania County—	
Goochland County.....	3	Fredericksburg.....	4
Greensville County.....	120	Stafford County.....	7
Halifax County.....	98	Surry County.....	27
Hanover County.....	64	Sussex County.....	17
Henrico County.....	30	Tazewell County.....	3
Richmond.....	3	Warren County.....	1
Henry County.....	5	Warwick County.....	12
Isle of Wight County.....	26	Westmoreland County.....	43
James City County.....	28	York County.....	64
King and Queen County.....	14	Total.....	2,069
King William County.....	32		

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Birmingham, Ala.....	1	3	Philadelphia, Pa.....	3	.....
Boston, Mass.....	2	.....	Richmond, Va.....	12	.....
Charleston, S. C.....	.....	1	Sacramento, Cal.....	7	.....
Chelsea, Mass.....	1	.....	San Francisco, Cal.....	1	.....
New Orleans, La.....	22	2	Stockton, Cal.....	2	.....
Newton, Mass.....	1	.....		

MEASLES.

See Diphtheria, measles, scarlet fever, and tuberculosis, page 2885.

PELLAGRA.

Massachusetts Report for September, 1916.

Place.	New cases reported.	Place.	New cases reported.
Massachusetts:		Massachusetts—Continued.	
Essex County—		Worcester County—	
Lynn.....	1	Worcester.....	3
Suffolk County—		Total.....	5
Boston.....	1		

State Reports for August, 1916.

Place.	New cases reported.	Place.	New cases reported.
Kansas:		Virginia—Continued.	
Brown County.....	1	Essex County.....	1
Cherokee County.....	1	Henrico County—	
Cowley County.....	1	Richmond.....	5
Jackson County.....	1	Henry County.....	3
Sedgwick County—		King and Queen County.....	6
Wichita.....	2	Lee County.....	1
Shawnee County—		Loudoun County.....	1
Topeka.....	1	Louisa County.....	1
Wabaunsee County.....	1	Mecklenburg County.....	1
Total.....	8	Nelson County.....	2
Virginia:		New Kent County.....	1
Albemarle County.....	1	Norfolk County.....	1
Amelia County.....	1	Patrick County.....	1
Amherst County.....	3	Pulaski County.....	1
Brunswick County.....	2	Spotsylvania County—	
Campbell County.....	1	Fredericksburg.....	1
Dinwiddie County—		Tazewell County.....	1
Petersburg.....	4	Washington County.....	1
		Total.....	40

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Birmingham, Ala.....		1	Mobile, Ala.....	1	2
Charleston, S. C.....		2	Nashville, Tenn.....	1	3
Columbia, S. C.....		1	New Orleans, La.....	2	

PLAGUE.

Louisiana—New Orleans—Plague-Infected Rats Found.

Passed Asst. Surg. Simpson reported that plague-infected rats have been found in New Orleans, La., as follows: A rat captured September 5, 1916, at 628 Canal Street, was proved positive September 29. A rat captured September 15 at 548 South Tonti Street, was proved positive October 1. A rat captured September 11, at 764 South Liberty Street, was proved positive October 2.

PNEUMONIA.

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Beaver Falls, Pa.....	1	.....	New Castle, Pa.....	2	.....
Binghamton, N. Y.....	4	1	Norfolk, Va.....	2	2
Canton, Ohio.....	2	1	Oakland, Cal.....	6	.....
Chicago, Ill.....	56	36	Philadelphia, Pa.....	38	22
Cleveland, Ohio.....	7	3	Pittsburgh, Pa.....	8	13
Detroit, Mich.....	1	9	Reading, Pa.....	1	.....
Evansville, Ind.....	2	2	San Francisco, Cal.....	4	2
Flint, Mich.....	1	.....	San Jose, Cal.....	1	.....
Grand Rapids, Mich.....	1	1	Wichita, Kans.....	1	.....
Los Angeles, Cal.....	4	2	Wilkes-Barre, Pa.....	1	1

POLIOMYELITIS (INFANTILE PARALYSIS).

Cases Reported by States.

The following tabular statement shows the number of cases of poliomyelitis reported to the United States Public Health Service by State health authorities during the periods shown: .

	Total cases reported.		Total cases reported.
Alabama:		Idaho:	
July 1 to 31.....	77	Aug. 1 to 31.....	4
Aug. 1 to 31.....	62	Sept. 1 to 30.....	3
Sept. 1 to 25.....	12	Oct. 1 to 7.....	2
	151		9
Arizona:		Illinois:	
July 1 to 31.....	2	July 1 to 31.....	76
Aug. 1 to 31.....	2	Aug. 1 to 31.....	339
Sept. 1 to 25.....	2	Sept. 1 to 30.....	257
	6	Oct. 1 to 7.....	45
Arkansas:			717
July 1 to 31.....	5	Indiana:	
Aug. 1 to 31.....	1	July 1 to 31.....	27
Sept. 1 to 25.....	0	Aug. 1 to 31.....	38
	6	Sept. 1 to 30.....	65
California:		Oct. 1 to 7.....	10
July 1 to 31.....	12		140
Aug. 1 to 31.....	18	Iowa:	
Sept. 1 to 30.....	13	July 1 to 31.....	30
Oct. 1 to 7.....	2	Aug. 1 to 31.....	82
	45	Sept. 1 to 30.....	70
Colorado:		Oct. 1 to 7.....	7
July 1 to 31.....	1		159
Aug. 1 to 31.....	2	Kansas:	
Sept. 1 to 30.....	4	July 1 to 31.....	14
Oct. 1 to 7.....	1	Aug. 1 to 31.....	² 31
	8	Sept. 1 to Oct. 7.....	28
Connecticut:			73
July 1 to 31.....	165	Kentucky:	
Aug. 1 to 31.....	367	July 1 to 31.....	15
Sept. 1 to 30.....	241	Aug. 1 to 31.....	19
Oct. 1 to 7.....	28	Sept. 1 to 28.....	1
	801		35
Delaware:		Louisiana:	
July 1 to 31.....	1	July 1 to 31.....	19
Aug. 1 to 31.....	11	Aug. 1 to 31.....	6
Sept. 1 to 30.....	36	Sept. 1 to 30.....	6
Oct. 1 to 7.....	4	Oct. 1 to 7.....	0
	52		31
District of Columbia:		Maine:	
July 1 to 31.....	8	July 1 to 31.....	0
Aug. 1 to 31.....	18	Aug. 1 to 31.....	26
Sept. 1 to 30.....	6	Sept. 1 to 30.....	46
Oct. 1 to 11.....	5	Oct. 1 to 7.....	21
	37		93
Florida:		Maryland:	
July 1 to 31.....	4	July 1 to 31.....	10
Aug. 1 to 31.....	3	Aug. 1 to 31.....	64
Sept. 1 to 25.....	1	Sept. 1 to 30.....	100
	8	Oct. 1 to 10.....	51
Georgia	(1)		225

¹ Disease present, but the number of cases is not known.

² Corrected figures. Later report than figures previously published.

POLIOMYELITIS (INFANTILE PARALYSIS)—Continued.

Cases Reported by States—Continued.

	Total cases reported.		Total cases reported.
Massachusetts:		Oregon:	
July 1 to 31.....	107	Sept. 1 to 30.....	3
Aug. 1 to 31.....	253	Oct. 1 to 7.....	5
Sept. 1 to 30.....	1,626		
Oct. 1 to 11.....	290		8
	1,276	Pennsylvania:	
Michigan:		July 1 to 31.....	107
July 1 to 31.....	51	Aug. 1 to 31.....	711
Aug. 1 to 31.....	163	Sept. 1 to 30.....	743
Sept. 1 to 25.....	117		1,561
Oct. 1 to 7.....	25	Rhode Island:	
	356	July 1 to 31.....	26
Minnesota:		Aug. 1 to 31.....	57
July 1 to 31.....	142	Sept. 1 to 30.....	70
Aug. 1 to 31.....	373	Oct. 1 to 7.....	13
Sept. 1 to 30.....	1,204		166
Oct. 1 to 7.....	43	South Carolina:	
	762	July 1 to 31.....	20
Mississippi:		Aug. 1 to 31.....	58
July 1 to 31.....	57	Sept. 1 to 30.....	25
Aug. 1 to 31.....	31	Oct. 1 to 10.....	7
Sept. 1 to 30.....	3		110
	91	South Dakota:	
Missouri:		July 1 to 31.....	5
July 1 to 31.....	4	Aug. 1 to 31.....	19
Aug. 1 to 31.....	3	Sept. 1 to 25.....	14
Sept. 1 to 25.....	4		38
	11	Tennessee:	
Montana:		July 1 to 31.....	18
July 1 to 31.....	11	Aug. 1 to 31.....	21
Aug. 1 to 31.....	28	Sept. 1 to 25.....	0
Sept. 1 to 25.....	15		39
Oct. 1 to 7.....	3	Texas:	
	57	July 1 to 31.....	22
Nebraska:		Aug. 1 to 31.....	25
July 1 to 31.....	1	Sept. 1 to 30.....	16
Aug. 1 to 31.....	7		63
Sept. 1 to 28.....	6	Utah:	
	14	Aug. 1 to 31.....	
Nevada:			5
July 1 to Sept. 24.....	0	Vermont:	
	0	July 1 to 31.....	1
New Hampshire:		Aug. 1 to 31.....	8
July 1 to 31.....	7	Sept. 1 to 30.....	23
Aug. 1 to 31.....	16	Oct. 1 to 7.....	3
Sept. 1 to 30.....	29		35
Oct. 3.....	1	Virginia:	
	53	July 1 to 31.....	24
New Jersey:		Aug. 1 to 31.....	44
July 1 to 31.....	640	Sept. 1 to Oct. 11.....	53
Aug. 1 to 31.....	2,114		121
Sept. 1 to 30.....	911	Washington:	
Oct. 1 to 12.....	212	July 1 to 31.....	5
	3,877	Aug. 1 to 31.....	2
New Mexico:		Sept. 1 to 30.....	10
July 1 to Sept. 25.....	0	Oct. 1 to 7.....	2
	0		19
New York (exclusive of New York City):		West Virginia:	
July 1 to 31.....	430	July 1 to 31.....	5
Aug. 1 to 31.....	1,700	Aug. 1 to 31.....	10
Sept. 1 to Oct. 2.....	1,258	Sept. 1 to 30.....	16
	3,388	Oct. 1 to 7.....	6
North Carolina:			37
July 1 to 31.....	0	Wisconsin:	
Aug. 1 to 31.....	2	July 1 to 31.....	20
Sept. 1 to 25.....	6	Aug. 1 to 31.....	173
	8	Sept. 1 to 30.....	158
Ohio:			351
July 1 to 31.....	94	Wyoming:	
Aug. 1 to 31.....	168	July 1 to 31.....	0
Sept. 1 to 25.....	47	Aug. 1 to 31.....	1
	309	Sept. 1 to 30.....	3
Oklahoma:			4
July 1 to 31.....	12		
Aug. 1 to 31.....	10		
Sept. 1 to 25.....	2		
	24		

¹ Corrected figures. Later report than figures previously published.

² Not including cases on Crow Reservation.

³ Disease present, but the number of cases is not known.

POLIOMYELITIS (INFANTILE PARALYSIS)—Continued.

City Reports—July 9 to October 7, 1916.

The following table shows the number of cases of poliomyelitis reported to the United States Public Health Service by the health departments of cities which reported five or more cases in any one week during July, August, and September, 1916:

City.	Cases reported for week ended—												
	July 15.	July 22.	July 29.	Aug. 5.	Aug. 12.	Aug. 19.	Aug. 26.	Sept. 2.	Sept. 9.	Sept. 16.	Sept. 23.	Sept. 30.	Oct. 7.
Akron, Ohio.....			1				1	3	5	5	1		
Atlantic City, N. J.....					7	2	5	5		2	2		
Baltimore, Md.....		2	1	1	5	4	9	16	12	13	10	29	20
Bayonne, N. J.....	1		1	4	12	14	4	1	5	1			
Birmingham, Ala.....		1	3	6	1		2						
Boston, Mass.....		3	4	4	8	4	8	13	22	38	55	52	
Bridgeport, Conn.....		4	5	6	6		3	3		7	2	2	3
Cambridge, Mass.....				1		2	2	1	2	5	4	5	11
Camden, N. J.....			2	5	11	13	6	9	5	7	2	1	3
Chicago, Ill.....	4	10	13	15	23	25	22	24	25	21	20	13	10
Cincinnati, Ohio.....	1	1	1	2	2	4	5	2	3	6	3	4	5
Cleveland, Ohio.....	4	2	1	1	1	1	2	5	2	3	1	1	2
Detroit, Mich.....	2	1	3	4	1		6	1	4	3	3	11	3
East Orange, N. J.....		1	3	7	2	8	10	6	10	3	2	2	
Flint, Mich.....			4	1	3	3	8		4		4	2	
Grand Rapids, Mich.....	1	2		1		3	1	1	2	1	6	1	
Harrison, N. J.....	1	1			10	10	6						
Hartford, Conn.....	2	1	3	3			4	6	7	5	5	4	4
Haverhill, Mass.....						1	5			1	1	2	
Indianapolis, Ind.....	1	1		2					5	4	2	4	1
Jersey City, N. J.....	5	8	17	27	22	27	16	22	9	6	8	11	2
Kearny, N. J.....	1		3	6	7	4	5			3			
Long Branch, N. J.....			1	1	1	1	2	8		4	1	1	
Malden, Mass.....		1				2				2	6	10	
Manchester, N. H.....				1				3	5	1	5		
Minneapolis, Minn.....				8	8	12	14	12	4	5	3		
Montclair, N. J.....		1	1		4	5	2	1	2	1		4	1
Newark, N. J.....	65		137	247	260	230	150	89	45	38	30	12	
Newburyport, Mass.....							1	2	5	1	7	2	1
New York, N. Y.....	933	741	912	1,117	1,151	865	707	441	352	252	156	142	96
North Adams, Mass.....		4		1			5	2	2	1	4	1	
Northampton, Mass.....				1		5	2	1	1		1		1
Orange, N. J.....	3	2	10	15	9	8	10	15	4	1	2	1	
Perth Amboy, N. J.....	3	2	4	5	4	2	3	1	3	2			
Philadelphia, Pa.....		9	16	31	86	106	132	120	125	85	70	47	59
Pittsburgh, Pa.....	1	1	3	1	5	1	3	5	5	2	1	1	4
Pittsfield, Mass.....	1	1			1	2	7	2	10	8	6	4	4
Plainfield, N. J.....		2	3		2	6	10	1	6	4	2	3	1
Providence, R. I.....	2	1	3	3	4	3	2	10	7	10	17	9	9
Quincy, Mass.....										4	5	4	
St. Louis, Mo.....	1		2				5	2					
St. Paul, Minn.....			5	13	6	9	6	8	7	2	3	2	4
Somerville, Mass.....			1			6	1	2	1	7	1		5
Springfield, Mass.....			2	2	2		5	5	9	12	8	9	5
Syracuse, N. Y.....				9	3	23	34	33	49	29	20	12	11
Toledo, Ohio.....	9	8	11	11	16	10	10	7	11	1	2	3	1
Trenton, N. J.....	2	1	1		4	7	11	7	11	14	23	34	20
Washington, D. C.....	2	3	2	2	3	5	7	2	4		1	1	5
West Hoboken, N. J.....	1	3	3	5	9	3	7						
Wilmington, Del.....							3	3	3	2	3	8	7

Delaware.

The State board of health of Delaware on October 4, 1916, removed its quarantine for poliomyelitis, which had been in operation against the States of New York, New Jersey, and Pennsylvania.

POLIOMYELITIS (INFANTILE PARALYSIS)—Continued.

New York City.

Surg. Lavinder reported that cases of poliomyelitis were notified in New York City as follows: October 4, 23 cases; October 5, 13 cases; October 6, 19 cases; October 7, 12 cases; October 8, 8 cases; October 9, 13 cases; October 10, 15 cases; October 11, 11 cases; Approximate corrected totals to October 11, 1916, 9,177 cases; 2,343 deaths.

Massachusetts Report for September, 1916.

Place.	Total cases reported.	Place.	Total cases reported.
Massachusetts:		Massachusetts—Continued.	
Barnstable County—		Middlesex County—Continued.	
Barnstable.....	1	Everett.....	10
Bourne.....	1	Framingham.....	1
Berkshire County—		Hudson.....	1
Adams.....	5	Lexington.....	1
Dalton.....	5	Lowell.....	5
Great Barrington.....	1	Malden.....	18
Mount Washington.....	1	Marlborough.....	1
North Adams.....	8	Medford.....	9
Otis.....	1	Melrose.....	2
Pittsfield.....	32	Newton.....	5
Stockbridge.....	1	North Reading.....	1
Bristol County—		Somerville.....	10
Fall River.....	3	Stoneham.....	1
Mansfield.....	1	Tewksbury.....	1
Taunton.....	1	Wakefield.....	1
North Attleboro.....	2	Waltham.....	2
Dukes County—		Watertown.....	1
Tisbury.....	2	Westford.....	1
Essex County—		Weston.....	1
Amesbury.....	9	Winchester.....	3
Beverly.....	8	Woburn.....	2
Boxford.....	2	Nantucket County—	
Danvers.....	2	Nantucket.....	1
Gloucester.....	1	Norfolk County—	
Hamilton.....	2	Braintree.....	5
Haverhill.....	4	Brookline.....	4
Lynn.....	9	Dedham.....	5
Marblehead.....	1	Dover.....	1
Methuen.....	1	Foxborough.....	1
Middleton.....	1	Milton.....	4
Nahant.....	1	Norwood.....	1
Newbury.....	2	Plainville.....	1
Newburyport.....	13	Quincy.....	12
North Andover.....	1	Stoughton.....	1
Peabody.....	1	Wellesley.....	1
Rockport.....	1	Weymouth.....	3
Salem.....	1	Plymouth County—	
Saugus.....	2	Bridgewater.....	1
Swampscott.....	1	Brockton.....	2
West Newbury.....	2	Hull.....	1
Franklin County—		Rockland.....	1
Bernardston.....	1	East Bridgewater.....	3
Conway.....	1	Suffolk County—	
Greenfield.....	1	Boston.....	172
Hampden County—		Chelsea.....	5
Agawam.....	1	Revere.....	8
Chicopee.....	8	Winthrop.....	2
Holyoke.....	59	Worcester County—	
Ludlow.....	2	Auburn.....	5
Monson.....	2	Blackstone.....	2
Palmer.....	1	Fitchburg.....	2
Southwick.....	1	Leicester.....	1
Springfield.....	39	Leominster.....	3
Westfield.....	1	Lunenburg.....	1
West Springfield.....	4	Milford.....	3
Hampshire County—		Princeton.....	1
Hadley.....	1	Oxford.....	1
Northampton.....	1	Southbridge.....	1
South Hadley.....	5	Warren.....	5
Williamsburg.....	1	Westminster.....	1
Middlesex County—		Worcester.....	7
Arlington.....	4		
Belmont.....	3	Total.....	627
Billerica.....	2		
Cambridge.....	14		

POLIOMYELITIS (INFANTILE PARALYSIS)—Continued.

State Reports for August, 1916.

Place.	New cases reported.	Place.	New cases reported.
Kansas:		Virginia:	
Brown County.....	1	Bedford County.....	3
Cowley County.....	1	Buckingham County.....	1
Dickinson County.....	1	Campbell County—	
Douglas County.....	1	Lynchburg.....	3
Ellis County.....	1	Caroline County.....	2
Ford County.....	1	Carroll County.....	1
Geary County.....	1	Fauquier County.....	2
Graham County.....	1	Frederick County.....	3
Gray County.....	2	Hanover County.....	2
Jefferson County.....	1	Henrico County.....	1
Kingman County.....	1	Richmond.....	3
Labette County.....	2	Henry County.....	4
Lyon County.....	2	King and Queen County.....	1
Montgomery County—		King George County.....	1
Coffeyville.....	2	Loudoun County.....	3
Morris County.....	1	Louisa County.....	1
Morton County.....	1	Madison County.....	2
Neosho County.....	1	Nansemond County.....	1
Norton County.....	1	Nelson County.....	1
Osage County.....	1	Orange County.....	2
Phillips County.....	1	Powhatan County.....	1
Riley County.....	1	Prince William County.....	1
Rooks County.....	1	Smyth County.....	3
Saline County.....	1	Warwick County—	
Scott County.....	1	Newport News.....	1
Sumner County.....	1	Washington County.....	1
Wabausee County.....	1		
Wyandotte County.....	1	Total.....	44
Total.....	31		

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Akron, Ohio.....	1		Lynn, Mass.....	1	
Allentown, Pa.....	1		Malden, Mass.....	6	2
Atlantic City, N. J.....	2		Manchester, N. H.....	5	
Baltimore, Md.....	10	2	Medford, Mass.....		1
Boston, Mass.....	55	18	Mobile, Ala.....	1	
Bridgeport, Conn.....	2		New Britain, Conn.....	4	
Brockton, Mass.....	2		Newburyport, Mass.....	7	2
Brookline, Mass.....	1		New Orleans, La.....		1
Cambridge, Mass.....	4		Newton, Mass.....	3	
Camden, N. J.....	2		New York, N. Y.....	156	63
Chelsea, Mass.....	3		Norristown, Pa.....	3	1
Chicago, Ill.....	20	3	North Adams, Mass.....	4	
Chicopee, Mass.....	3		Northampton, Mass.....	1	
Cincinnati, Ohio.....	3		Orange, N. J.....	2	1
Cleveland, Ohio.....	2		Philadelphia, Pa.....	70	27
Coffeyville, Kans.....	2		Pittsburgh, Pa.....	1	
Danville, Ill.....	1		Pittsfield, Mass.....	6	1
Denver, Colo.....	2		Plainfield, N. J.....	2	1
Detroit, Mich.....	3		Portland, Ore.....	1	
Duluth, Minn.....	1		Providence, R. I.....	17	5
East Orange, N. J.....	2		Quincy, Mass.....	5	1
El Paso, Tex.....	1		Richmond, Va.....	1	
Everett, Mass.....	2		Roanoke, Va.....	1	
Fall River, Mass.....	1		Saginaw, Mich.....	1	
Fitchburg, Mass.....	1		St. Paul, Minn.....	3	1
Flint, Mich.....	4		San Francisco, Cal.....	1	
Galesburg, Ill.....	1		Schenectady, N. Y.....	2	
Grand Rapids, Mich.....	6	1	Somerville, Mass.....	1	1
Hartford, Conn.....	5		Springfield, Mass.....	8	1
Haverhill, Mass.....	1		Syracuse, N. Y.....	20	8
Hoboken N. J.....	2		Toledo, Ohio.....	2	
Indianapolis, Ind.....	1		Trenton, N. J.....	23	8
Jersey City, N. J.....	8		Troy, N. Y.....	4	
Johnstown, Pa.....	2	1	Washington, D. C.....	1	
Kalamazoo, Mich.....	1		Wilkes-Barre, Pa.....	1	
Kalamazoo, Wis.....	2		Wilkesburg, Pa.....	1	
Long Branch, N. J.....	1		Wilmington, Del.....	3	2
Lynchburg, Va.....	1		Worcester, Mass.....	1	1

RABIES IN ANIMALS.

Washington—Seattle.

Surg. Lloyd reported that during the month of September, 1916, 2 cases of rabies in dogs, 1 of which was proved positive, were reported in Seattle, Wash. This makes a total of 489 cases in dogs, 8 in cattle, 4 in cats, 2 in horses, and one in a hog since September 10, 1913.

City Reports for Week Ended September 23, 1916.

During the week ended September 23, 1916, two cases of rabies in animals were reported at Buffalo, N. Y.; two cases at Detroit, Mich.; and two cases at St. Paul, Minn.

SCARLET FEVER.

See Diphtheria, measles, scarlet fever, and tuberculosis, page 2885.

SMALLPOX.

Kansas Report for August, 1916.

State.	New cases reported.	Deaths.	Vaccination history of cases.			
			Number vaccinated within seven years preceding attack.	Number last vaccinated more than seven years preceding attack.	Number never successfully vaccinated.	Vaccination history not obtained or uncertain.
Kansas:						
Butler County.....	1				1	
Ford County.....	2					2
Sedgwick County.....	4				3	1
Wichita.....	1					1
Washington County.....	7					7
Wyandotte County— Kansas City.....	1					1
Total.....	16				4	12

Miscellaneous State Reports.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Idaho (June 1-30):			North Dakota (July 1-31)—		
Bonneville County—			Continued.		
Idaho Falls.....	1		Stutsman County.....	2	
Idaho (Aug. 1-31):			Ward County.....	2	
Bannock County—			Total.....	60	
Pocatello.....	1				
North Dakota (July 1-31):			Virginia (Aug. 1-31):		
Barnes County.....	1		Fauquier County.....	8	
Bottineau County.....	1		Loudoun County.....	7	
Cass County.....	7		Pittsylvania County—		
Emmons County.....	3		Danville.....	1	
Golden Valley County.....	22		Total.....	16	
McKenzie County.....	21				
Morton County.....	1				

SMALLPOX—Continued.

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Butte, Mont.....	3	.....	Flint, Mich.....	1	.....
Cleveland, Ohio.....	1	.....	New Orleans, La.....	1	.....
Detroit, Mich.....	2	.....	St. Joseph, Mo.....	1	.....
El Paso, Tex.....	1	1	St. Paul, Minn.....	1	.....

TETANUS.

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Allentown, Pa.....	1	1	New Orleans, La.....		1
Boston, Mass.....	1	1	St. Louis, Mo.....		1
Detroit, Mich.....	1	1	Somerville, Mass.....		1
Harrisburg, Pa.....	1	1			

TUBERCULOSIS.

See diphtheria, measles, scarlet fever, and tuberculosis, page 2885.

TYPHOID FEVER.

Massachusetts.

Lynn.—Collaborating Epidemiologist Keiley reported that the epidemic of typhoid fever at Lynn, Mass., which was noted in the Public Health Reports September 8, 1916, at page 2450, is apparently at an end, the total number of cases notified being 114. He says: "Persistent search for a carrier has not yet been successful, but the milk supply at fault has been equipped with an up-to-date pasteurization plant and will soon be allowed to resume the sale of milk."

Whitman.—Collaborating Epidemiologist Kelley reported that on August 27, 1916, a positive Widal was obtained on J. D., a milk dealer of East Bridgewater, on whose route in Whitman there were some five or six cases of typhoid fever. Typhoid bacilli were isolated from the feces on September 2, 1916. This man had typhoid fever 20 or 30 years ago.

Pennsylvania—Harrisburg.

During September, 1916, 95 cases of typhoid fever were notified in Harrisburg, Pa., with 8 deaths.

During the week ended October 7, 1916, 91 cases of typhoid fever with 2 deaths were notified, making a total of 231 cases with 9 deaths since the beginning of the outbreak, August 16, 1916.

Eighty-eight per cent of the cases reported during the month of September were traced to a creamery company, which manufactured ice cream. This company obtained its milk from milk stations and separator plants in the Cumberland Valley. The plant has been closed and the product on hand destroyed.

TYPHOID FEVER—Continued.

Massachusetts Report for September, 1916.

Place.	New cases reported.	Place.	New cases reported.
Massachusetts:		Massachusetts—Continued.	
Barnstable County—		Middlesex County—Continued.	
Dennis.....	1	Concord.....	1
Provincetown.....	2	Everett.....	8
Berkshire County—		Lowell.....	9
Adams.....	4	Malden.....	3
Lenox.....	1	Marlborough.....	1
North Adams.....	9	Melrose.....	3
Pittsfield.....	1	Medford.....	3
Bristol County—		Newton.....	7
Easton.....	1	Reading.....	1
Fairhaven.....	1	Somerville.....	1
Fall River.....	53	Watertown.....	2
New Bedford.....	9	Westford.....	1
North Attleboro.....	4	Weston.....	1
Swansea.....	1	Winchester.....	1
Taunton.....	2	Woburn.....	4
Attleboro.....	4	Norfolk County—	
Essex County—		Braintree.....	1
Amesbury.....	2	Brookline.....	2
Andover.....	3	Canton.....	2
Beverly.....	3	Medfield.....	1
Danvers.....	1	Quincy.....	3
Haverhill.....	3	Walpole.....	1
Lawrence.....	7	Wellesley.....	1
Lynn.....	88	Weymouth.....	1
Middleton.....	1	Plymouth County—	
Newbury.....	1	Bridgewater.....	2
Newburyport.....	2	Brocton.....	4
Rowley.....	1	Rockland.....	1
Salem.....	1	Scituate.....	1
Saugus.....	1	West Bridgewater.....	2
Swampscott.....	1	Whitman.....	1
Franklin County—		Suffolk County—	
Montague.....	1	Boston.....	45
Orange.....	2	Chelsea.....	6
Hampden County—		Revere.....	3
Chicopee.....	1	Worcester County—	
Holyoke.....	1	Brookfield.....	1
Springfield.....	1	Fitchburg.....	2
Westfield.....	3	Gardner.....	3
Hampshire County—		Milford.....	1
Easthampton.....	1	West Boylston.....	1
Northampton.....	6	Winchendon.....	1
Middlesex County—		Webster.....	1
Arlington.....	1	Worcester.....	8
Billerica.....	1		
Cambridge.....	6	Total.....	373

State Reports for August, 1916.

Idaho:		Kansas—Continued.	
Bonneville County.....	1	Cheyenne County.....	1
Madison County—		Clark County.....	3
Rexburg.....	2	Cloud County.....	1
Teton County—		Comanche County.....	2
Driggs.....	1	Cowley County.....	17
Total.....	4	Crawford County.....	19
Kansas:		Decatur County.....	1
Allen County.....	7	Dickinson County.....	2
Anderson County.....	5	Doniphan County.....	12
Atchison County—		Douglas County.....	3
Atchison.....	3	Edwards County.....	2
Barber County.....	2	Elk County.....	4
Barton County.....	6	Ellis County.....	4
Bourbon County.....	8	Ellsworth County.....	6
Fort Scott.....	6	Finney County.....	1
Brown County.....	3	Ford County.....	6
Butler County.....	32	Franklin County.....	8
Chase County.....	2	Gove County.....	3
Chautauqua County.....	2	Gray County.....	1
Cherokee County.....	11	Greenwood County.....	3
		Harper County.....	6
		Harvey County.....	5

TYPHOID FEVER—Continued.

State Reports for August, 1916—Continued.

Place.	New cases reported.	Place.	New cases reported.
Kansas—Continued.		Virginia—Continued.	
Haskell County	1	Campbell County	8
Hodgeman County	4	Lynchburg	33
Jackson County	1	Caroline County	13
Jefferson County	2	Carroll County	12
Jewell County	3	Charlotte County	6
Johnson County	1	Chesterfield County	6
Kearny County	1	Clark County	2
Kingman County	2	Craig County	5
Kiowa County	6	Culpeper County	5
Labette County	13	Cumberland County	3
Parsons	3	Dickenson County	22
Leavenworth County	2	Dinwiddie County	3
Leavenworth	1	Elizabeth City County	3
Lincoln County	2	Essex County	5
Linn County	3	Fairfax County	4
Logan County	1	Fauquier County	13
Lyon County	9	Floyd County	8
Marion County	5	Fluvanna County	2
Marshall County	3	Franklin County	7
Meade County	1	Frederick County	9
Miami County	9	Giles County	5
Mitchell County	5	Gloucester County	17
Montgomery County	13	Grayson County	14
Coffeyville	22	Greene County	8
Morris County	3	Greensville County	2
Morton County	1	Halifax County	14
Neosho County	10	Hanover County	9
Ness County	1	Henrico County	7
Norton County	5	Richmond	113
Osage County	1	Henry County	18
Ottawa County	4	Highland County	2
Pawnee County	7	Isle of Wight County	6
Pratt County	2	James City County	1
Reno County	2	King and Queen County	5
Hutchinson	14	King William County	4
Rice County	5	Lancaster County	3
Riley County	1	Lee County	28
Rooks County	1	Loudoun County	21
Russell County	6	Louisa County	5
Saline County	2	Lunenburg County	3
Sedgewick County	2	Madison County	18
Wichita	36	Mecklenburg County	10
Seward County	6	Middlesex County	11
Shawnee County	1	Montgomery County	27
Topeka	10	Nansemond County	11
Smith County	1	Nelson County	14
Stafford County	1	New Kent County	2
Stevens County	1	Norfolk County	14
Summer County	18	Portsmouth	17
Thomas County	4	Northampton County	9
Wabamsee County	2	Northumberland County	16
Washington County	1	Nottoway County	13
Wilson County	6	Orange County	8
Wyandotte County	1	Page County	4
Kansas City	7	Patrick County	7
		Pittsylvania County	12
		Danville	8
Total	475	Powhatan County	4
		Princess Anne County	4
Virginia:		Prince Edward County	4
Accomac County	32	Prince George County	3
Albermarle County	8	Prince William County	2
Charlottesville	2	Pulaski County	10
Alexandria County	2	Richmond County	4
Alleghany County	9	Roanoke County	12
Amelia County	5	Roanoke	25
Amherst County	9	Rockbridge County	9
Appomattox County	8	Rockingham County	17
Augusta County	17	Russell County	11
Bath County	2	Scott County	15
Bedford County	32	Shenandoah County	13
Bland County	2	Smyth County	38
Botetourt County	3	Southampton County	16
Brunswick County	11	Spotsylvania County	4
Buchanan County	7	Fredericksburg	3
Buckingham County	7		

TYPHOID FEVER—Continued.

State Reports for August, 1916—Continued.

Place.	New cases reported.	Place.	New cases reported.
Virginia—Continued.		Virginia—Continued.	
Stafford County.....	21	Westmoreland County.....	6
Surry County.....	5	Wise County.....	26
Sussex County.....	1	Wythe County.....	5
Tazewell County.....	18	York County.....	1
Warren County.....	3	Total.....	1,107
Warwick County.....	2		
Washington County.....	33		

State Reports for July, 1916.

Idaho:		North Dakota—Continued.	
Kootenai County—		Dickey County.....	4
Harrison.....	1	Golden Valley County.....	1
North Dakota:		McLean County.....	8
Burleigh County.....	3	Mountrail County.....	1
Cass County.....	2	Total.....	22
Cavalier County.....	3		

Idaho Report for May, 1916.

Idaho:		Idaho—Continued.	
Franklin County—		Teton County—	
Mink Creek.....	1	Driggs.....	1
Preston.....	1	Total.....	5
Nez Perce County—			
Lewiston.....	2		

City Reports for Week Ended Sept. 23, 1916.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Akron, Ohio.....	3		El Paso, Tex.....	1	
Allentown, Pa.....	2		Everett, Mass.....	4	
Ann Arbor, Mich.....	2		Fall River, Mass.....	8	2
Atlantic City, N. J.....	2		Fitchburg, Mass.....	1	
Baltimore, Md.....	33	3	Flint, Mich.....	5	1
Binghamton, N. Y.....	1		Fort Worth, Tex.....	1	1
Birmingham, Ala.....	16	4	Galveston, Tex.....	2	
Boston, Mass.....	12		Grand Rapids, Mich.....	2	
Braddock, Pa.....	2		Harrisburg, Pa.....	17	1
Bridgeport, Conn.....	1		Hartford, Conn.....	2	
Buffalo, N. Y.....	13		Haverhill, Mass.....	1	1
Butler, Pa.....	1		Indianapolis, Ind.....	27	
Butte, Mont.....	2		Jackson, Mich.....	2	1
Cambridge, Mass.....	1		Jersey City, N. J.....	4	2
Camden, N. J.....	5		Johnstown, Pa.....	2	
Canton, Ohio.....	3	2	Kalamazoo, Mich.....	2	
Charleston, S. C.....	6		Kansas City, Kans.....	2	
Chelsea, Mass.....	1		Kenscha, Wis.....	1	
Chicago, Ill.....	21	2	Knoxville, Tenn.....	1	
Cincinnati, Ohio.....	4		Kokomo, Ind.....	4	
Cleveland, Ohio.....	6	1	Lawrence, Mass.....	1	1
Coffeyville, Kans.....	3		Lincoln, Nebr.....	2	
Columbia, S. C.....	2	1	Lowell, Mass.....	1	1
Columbus, Ohio.....	5	1	Lynchburg, Va.....	2	
Cumberland, Md.....	2		Lynn, Mass.....	4	1
Danville, Ill.....	2		Marquette, Wis.....	1	
Denver, Colo.....	2	1	Medford, Mass.....	1	
Detroit, Mich.....	9	1	Melrose, Mass.....	2	
Dubuque, Iowa.....	1	1	Milwaukee, Wis.....	4	1
Duluth, Minn.....	3		Minneapolis, Minn.....	4	
East Orange, N. J.....	2		Mobile, Ala.....	1	
Elgin, Ill.....	12	3	Nashville, Tenn.....	3	3

TYPHOID FEVER—Continued.**City Reports for Week Ended Sept. 23, 1916—Continued.**

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
New Bedford, Mass.....	4	.....	Saginaw, Mich.....	1	.....
Newburyport, Mass.....	1	.....	St. Joseph, Mo.....	2	.....
New Castle, Pa.....	2	.....	St. Louis, Mo.....	21	3
New Haven, Conn.....	1	.....	St. Paul, Minn.....	1	.....
New Orleans, La.....	10	1	San Diego, Cal.....	2	.....
Newton, Mass.....	2	.....	San Francisco, Cal.....	5	1
New York, N. Y.....	76	9	Schenectady, N. Y.....	1	.....
Niagara Falls, N. Y.....	1	.....	Somerville, Mass.....	1	.....
Norfolk, Va.....	5	.....	South Bend, Ind.....	1	2
North Adams, Mass.....	2	.....	Springfield, Ill.....	3	.....
Northampton, Mass.....	1	.....	Springfield, Mass.....	1	1
Omaha, Nebr.....	4	.....	Springfield, Ohio.....	2	.....
Philadelphia, Pa.....	32	3	Steelton, Pa.....	2	.....
Pittsburgh, Pa.....	5	1	Syracuse, N. Y.....	3	.....
Plainfield, N. J.....	1	.....	Tacoma, Wash.....	1	.....
Portland, Me.....	3	1	Toledo, Ohio.....	18	3
Portsmouth, Va.....	2	.....	Topeka, Kans.....	2	.....
Providence, R. I.....	2	.....	Trenton, N. J.....	1	.....
Racine, Wis.....	2	.....	Troy, N. Y.....	3	.....
Reading, Pa.....	19	1	Washington, D. C.....	14	1
Richmond, Va.....	3	3	Wheeling, W. Va.....	10	1
Roanoke, Va.....	2	1	Wichita, Kans.....	1	.....
Rochester, N. Y.....	6	1	Williamsport, Pa.....	2	.....
Rutland, Vt.....	2	.....	Wilmington, Del.....	1	1
Sacramento, Cal.....	2	.....		

TYPHUS FEVER.**California.**

The secretary of the State board of health of California reported October 5 that a case of typhus fever in a Mexican had been notified at a railroad camp at Traver, Tulare County.

City Reports for Week Ended Sept. 23, 1916.

During the week ended September 23, 1916, one case of typhus fever was reported at El Paso, Tex., and one case at Los Angeles, Cal.

DIPHThERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.**Massachusetts Report for September, 1916.**

During the month of September, 1916, 470 cases of diphtheria, 174 cases of measles, and 202 cases of scarlet fever were reported in Massachusetts.

State Reports for August, 1916.

During the month of August, 1916, 3 cases of measles were reported in Idaho; 71 cases of diphtheria, 93 cases of measles, and 62 cases of scarlet fever were reported in Kansas; and 190 cases of diphtheria, 301 cases of measles, and 88 cases of scarlet fever were reported in Virginia.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

State Reports for July, 1916.

During the month of July, 1916, 7 cases of measles and 1 case of scarlet fever were reported in Idaho, and 26 cases of diphtheria, 86 cases of measles, and 13 cases of scarlet fever were reported in North Dakota.

Idaho Reports for May and June, 1916.

During the month of May, 1916, 7 cases of diphtheria and 34 cases of measles were reported in Idaho. During the month of June 1 case of diphtheria, 9 cases of measles, and 5 cases of scarlet fever were reported.

City Reports for Week Ended Sept. 23, 1916.

City.	Popula- tion as of July 1, 1915 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Over 500,000 inhabitants:										
Baltimore, Md.	584,605	158	11	3	1	1	10	1	50	20
Boston, Mass.	745,139	229	45	8	8	1	15	1	67	26
Chicago, Ill.	2,447,045	658	105	14	13	28	1	234	77	
Cleveland, Ohio.	656,975	166	23	1	2	5	1	41	19	
Detroit, Mich.	554,717	199	72	3	3	11	1	40	13	
New York, N. Y.	5,468,190	1,196	129	9	23	1	19	1	366	139
Philadelphia, Pa.	1,683,664	491	33	5	7	9	1	191	54	
Pittsburgh, Pa.	571,984	141	18	1	16	2	2	28	9	
St. Louis, Mo.	745,988	200	43	2	4	25	1	39	20	
From 300,000 to 500,000 inhab- itants:										
Buffalo, N. Y.	461,335	157	14	2	1	1	11	1	29	16
Cincinnati, Ohio.	406,706	109	29	2	2	9	1	23	11	
Jersey City, N. J.	300,133	72	7	1	1	1	1	18	10	
Los Angeles, Cal.	465,367	105	3	1	2	6	1	48	21	
Milwaukee, Wis.	428,062	171	17	1	1	11	1	22	3	
Minneapolis, Minn.	353,460	21	21	1	1	8	1	1	1	
New Orleans, La.	366,484	132	21	3	11	2	2	40	28	
San Francisco, Cal.	416,912	104	21	1	3	16	1	14	10	
Washington, D. C.	358,679	127	9	1	3	5	1	24	13	
From 200,000 to 300,000 inhab- itants:										
Columbus, Ohio.	209,722	71	10	1	1	7	1	9	6	
Denver, Colo.	253,161	3	3	1	1	1	1	1	14	
Indianapolis, Ind.	265,573	15	15	1	1	6	1	25	1	
Portland, Oreg.	272,838	35	2	1	31	6	1	6	1	
Providence, R. I.	250,025	68	4	1	1	3	1	6	10	
Rochester, N. Y.	250,747	66	8	1	3	1	1	10	3	
St. Paul, Minn.	241,999	41	2	1	1	2	1	8	5	
From 100,000 to 200,000 inhab- itants:										
Birmingham, Ala.	174,108	59	6	2	1	3	1	6	7	
Bridgeport, Conn.	118,434	29	2	1	1	1	1	1	2	
Cambridge, Mass.	111,669	29	12	1	1	1	1	7	1	
Camden, N. J.	104,349	7	7	1	1	1	1	4	1	
Fall River, Mass.	126,904	37	6	1	4	2	2	6	3	
Grand Rapids, Mich.	125,759	28	2	1	2	3	1	4	4	
Hartford, Conn.	108,969	2	2	1	1	1	1	4	5	
Lowell, Mass.	112,124	41	7	1	5	1	1	8	6	
Lynn, Mass.	100,316	19	10	1	1	1	1	3	2	
Nashville, Tenn.	115,978	37	7	1	2	2	1	7	4	
New Bedford, Mass.	114,694	27	2	1	1	1	1	8	1	
New Haven, Conn.	147,095	2	2	1	1	2	1	2	3	
Oakland, Cal.	190,893	1	1	1	6	5	1	9	6	
Omaha, Nebr.	135,455	34	9	1	1	1	1	1	3	
Reading, Pa.	105,094	34	1	1	1	2	1	4	1	

¹ Population Apr. 15, 1910; no estimate made.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

City Reports for Week Ended Sept. 23, 1916—Continued.

City.	Population as of July 1, 1915 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
From 100,000 to 200,000 inhabitants—Continued.										
Richmond, Va.	154,674	61	8				3		5	9
Springfield, Mass.	103,216	24	1		2	1			4	
Syracuse, N. Y.	152,534	54	7	1			5		6	2
Tacoma, Wash.	106,094	13	11		10					
Toledo, Ohio	187,840	76	2		1		4		10	7
Trenton, N. J.	109,212	56	6	1					3	3
Worcester, Mass.	160,523	57	8		1		5		7	6
From 50,000 to 100,000 inhabitants:										
Akron, Ohio	82,958		18				2		1	
Allentown, Pa.	61,901		1						1	
Atlantic City, N. J.	55,806		1						2	
Bayonne, N. J.	67,582		1						1	
Berkeley, Cal.	54,879	5					1			
Binghamton, N. Y.	53,082	22	9						1	
Brockton, Mass.	65,746	7							1	
Canton, Ohio	59,139	18	5	1	1					
Charleston, S. C.	60,427	30								3
Covington, Ky.	56,520	8	1							2
Duluth, Minn.	91,913				1		1			
El Paso, Tex.	51,936	45			2	1		1		2
Evansville, Ind.	72,125	25	2				4			5
Flint, Mich.	52,159	20	3							
Fort Worth, Tex.	99,528	17					1			
Harrisburg, Pa.	70,754	31	3						7	5
Hoboken, N. J.	76,104	17	3						4	3
Johnstown, Pa.	66,585	21	1		2					
Kansas City, Kans.	96,854		8	1	1		3		2	1
Lawrence, Mass.	98,197	27	4	1					7	4
Malden, Mass.	50,067	13			1		1		3	1
Manchester, N. H.	76,959	21	1		2				1	
Mobile, Ala.	56,536		1				1		2	3
New Britain, Conn.	52,203	1								1
Norfolk, Va.	88,076	27					1			
Passaic, N. J.	69,010	18	1						2	
Pawtucket, R. I.	59,156	23	4							1
Portland, Me.	63,014	18	2				1			
Rockford, Ill.	53,761	11								2
Sacramento, Cal.	64,806	20	2						1	4
Saginaw, Mich.	54,815	22					2			
St. Joseph, Mo.	83,974	21	2				1			1
San Diego, Cal.	51,115	15					1			
Schneectady, N. Y.	95,265	14	1						8	
Somerville, Mass.	85,460	16	1				1		5	2
South Bend, Ind.	67,030	17	3	1			1		5	
Springfield, Ill.	59,468	18	4	1						1
Springfield, Ohio.	50,804	16	3		1		2			2
Troy, N. Y.	77,738						1		4	3
Wichita, Kans.	67,847								3	
Wilkes-Barre, Pa.	75,218	20	1	1					2	1
Wilmington, Del.	93,161	42	1				1			
York, Pa.	50,543		2				1		1	
From 25,000 to 50,000 inhabitants:										
Alameda, Cal.	27,031	5								1
Brookline, Mass.	31,934	5	2						1	
Butler, Pa.	26,587	8					1			
Butte, Mont.	42,918	24	3						1	2
Chelsea, Mass.	32,452	14	1							
Chicopee, Mass.	28,688	12	3		1					
Columbia, S. C.	34,058	9					1		1	
Cumberland, Md.	25,564	5	1				2		1	
Danville, Ill.	31,554	9							4	1
Dubuque, Iowa.	39,650								2	2
East Orange, N. J.	41,155	4							1	
Elgin, Ill.	27,844	7	1				1			
Everett, Mass.	38,307	7	2						1	2
Fitchburg, Mass.	41,144	8	3						2	
Galveston, Tex.	41,076	13							1	4
Haverhill, Mass.	47,774						1		1	1
Jackson, Mich.	34,730	19	1				1		1	

† Population Apr. 15, 1910; no estimate made.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

City Reports for Week Ended Sept. 23, 1916—Continued.

City.	Population as of July 1, 1915 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
From 25,000 to 50,000 inhabitants—Continued.										
Kalamazoo, Mich.	47,364	11							2	2
Kenosha, Wis.	30,319	6	5	2				1		
Knoxville, Tenn.	38,300		1							
La Crosse, Wis.	31,522	14	3							1
Lexington, Ky.	39,703	16	13				1			2
Lincoln, Nebr.	46,028	6					3		1	
Long Beach, Cal.	26,012	8								
Lynchburg, Va.	32,385	6	1				1		1	1
Madison, Wis.	30,064						1			
Medford, Mass.	25,737	7					1		2	
New Castle, Pa.	40,351						2			
Newport, R. I.	29,631	8	1							
Newton, Mass.	43,085	4					2			
Niagara Falls, N. Y.	36,240								6	2
Norristown, Pa.	30,833	7	2							
Ogden, Utah.	30,466	7	1				1			
Orange, N. J.	32,524	11	2						2	
Pasadena, Cal.	43,859	7							1	1
Perth Amboy, N. J.	39,725						1		4	
Pittsfield, Mass.	37,580	13	2						2	
Portsmouth, Va.	38,610	7	3	2						
Quincy, Ill.	36,764	8	1							
Quincy, Mass.	37,251	9							1	
Racine, Wis.	45,507	22								
Roanoke, Va.	41,929	12	5				2		1	
San Jose, Cal.	37,994	7							2	
Steubenville, Ohio	26,631	17								
Stockton, Cal.	34,508	10					1		1	
Superior, Wis.	45,285	12								1
Taunton, Mass.	35,987	13	3	1			1		4	1
Topeka, Kans.	47,914	17	3		1					
Waltham, Mass.	30,129	6	1				1			
Watertown, N. Y.	29,384								1	
West Hoboken, N. J.	41,893	5	1				1			1
Wheeling, W. Va.	43,097	11					2			2
Williamsport, Pa.	33,496		2							
Wilmington, N. C.	28,264	7								
Zanesville, Ohio.	30,406	10					1			1
From 10,000 to 25,000 inhabitants:										
Ann Arbor, Mich.	14,979	5							4	
Beaver Falls, Pa.	13,316		1							
Braddock, Pa.	21,310	8	2						2	1
Cairo, Ill.	15,593	4								
Clinton, Mass.	13,075	1	1				2			
Coffeyville, Kans.	16,765				1					
Concord, N. H.	22,480	6	2							2
Galesburg, Ill.	23,923	3								
Kokomo, Ind.	20,312	8	2						3	
Long Branch, N. J.	15,057	4								
Marinette, Wis.	14,610	3								
Melrose, Mass.	17,166	4							1	
Morristown, N. J.	13,158	5								
Naticoke, Pa.	22,441	6								
Newburyport, Mass.	15,195	6								
New London, Conn.	20,771	4								
North Adams, Mass.	22,019	4							1	
Northampton, Mass.	19,846	6			2					1
Phoenix, Ariz.	17,798	5								4
Plainfield, N. J.	23,280	7					1		4	
Rutland, Vt.	14,624	2					4			1
Sandusky, Ohio.	20,160				3					
Saratoga Springs, N. Y.	12,842	6							1	
Steelton, Pa.	15,337	4								
Wilkinsburg, Pa.	22,361						1			
Woburn, Mass.	15,862	2								

¹ Population Apr. 15, 1910; no estimate made.

FOREIGN.

BARBADOS.

Yellow Fever.

Yellow fever has been reported present in Barbados, 3 cases with 2 deaths having occurred during the week ended September 23, 1916.

CANADA.

Poliomyelitis—Ontario and Saskatchewan.

Cases of poliomyelitis were reported in the Province of Ontario as follows: During the month of July, 1916, 20; August, 44; September, 49, cases, with 5 deaths. The presence of cases of poliomyelitis in the Province of Saskatchewan was reported September 22, 1916, as follows: At Lang, 3 cases; at Midale, 5 cases; Weyburn, 1 case; and Wilcox, 2 cases.

CHINA.

Cholera—Macao.

An outbreak of cholera was reported at Macao, China, August 17, 1916.

CUBA.

Communicable Diseases—Habana.

Communicable diseases have been notified at Habana as follows:

Diseases.	Aug. 31-Sept. 9, 1916.		Remain- ing under treatment Sept. 9, 1916.
	New cases.	Deaths.	
Diphtheria.....	2	.....	3
Leprosy.....	.....	.....	244
Malaria.....	1	.....	3
Measles.....	29	4	8
Paratyphoid fever.....	1	.....	6
Poliomyelitis.....	.....	.....	1
Scarlet fever.....	2	.....	3
Typhoid fever.....	10	4	52

Quarantine Measures.

The Cuban quarantine service on September 29, 1916, declared the removal of quarantine against the ports of Mexico as previously established on account of cholera. On the same date quarantine was established against the State of Vera Cruz, Mexico, on account of

yellow fever, in extension of the quarantine previously established against the States of Yucatan, Campeche, and Tabasco, on account of that disease.

Under date of October 4, 1916, the Cuban quarantine service suspended the quarantine previously declared against the ports of the Republic of Colombia situated on the Atlantic (Caribbean) coast, on account of yellow fever.

GREAT BRITAIN.

Examination of Rats—Liverpool.

During the two weeks ended September 9, 1916, 425 rats were examined at Liverpool. No plague infection was found.

Plague—Liverpool.

A report from Liverpool dated September 29, 1916, gives the total number of plague cases as 5, with 3 deaths. Two suspect cases were isolated for observation.

GUATEMALA.

Quarantine Measures.

By presidential decree dated September 1, 1916, the Republic of Guatemala established quarantine regulations against children under 16 years of age coming from the United States and Mexico, on account of poliomyelitis.

INDIA.

Anthrax—Madras Presidency.

During the month of June, 1916, 615 cases of anthrax were reported in Madras Presidency, India.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER.

Reports Received During Week Ended Oct. 13, 1916.¹

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Hongkong.....	Aug. 6-Sept. 2.....	9	9	Chinese. Present. Chinese.
Macao.....	Aug. 17.....			
Shanghai.....	Aug. 20-26.....		2	
India:				
Bombay.....	.....do.....	5	6	East Java, July 1-24, 1916: Cases, 6; deaths, 2. Mid Java, July 1-24, 1916: Cases, 20; deaths, 18. West Java, July 14-27, 1916: Cases, 243; deaths, 157.
Rangoon.....	July 1-31.....	1	1	
Java.....				

¹ From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.**Reports Received During Week Ended Oct. 13, 1916—Continued.****CHOLERA—Continued.**

Place.	Date.	Cases.	Deaths.	Remarks.
Philippine Islands:				
Manila.....	Aug. 13-26.....	137	80	Not previously reported: Cases, 16; deaths, 1. Aug. 13-26, 1916: Cases, 514; deaths, 316.
Provinces.....				
Albay.....	Aug. 13-26.....	83	45	
Bataan.....	Aug. 20-26.....	1		
Batangas.....	Aug. 13-26.....	4	2	
Bulacan.....	do.....	91	57	
Camarines.....	do.....	134	81	
Cavite.....	do.....	4	3	
Iloilo.....	Aug. 20-26.....	23	17	
Laguna.....	Aug. 13-26.....	28	27	
Misamis.....	do.....	53	24	
Pampanga.....	do.....	32	24	
Rizal.....	do.....	45	26	
Romblon.....	do.....	3	3	
Zambales.....	Aug. 20-26.....	13	7	
Turkey in Asia:				
Jaffa.....	July 9-15.....	39	25	
Trebizond.....	Aug. 6-Sept. 2.....	37	7	

PLAGUE.

Brazil:				
Pernambuco, State.....	Jan. 1-Mar. 31.....			Several cases.
Ceylon:				
Colombo.....	Aug. 6-19.....	14	14	
China:				Present in vicinity Aug. 12. Chinese.
Amoy.....				
Hongkong.....	Aug. 6-Sept. 2.....	1	1	
Egypt:				
Port Said.....	May 7-27.....	3	5	
Great Britain:				
Liverpool.....	Sept. 29.....	2	3	
India:				
Bombay.....	Aug. 20-26.....	13	10	
Karachi.....	do.....	2	2	
Madras Presidency.....	do.....	228	144	
Rangoon.....	July 1-Aug. 19.....	185	171	
Java:				
Residencies—				
Paseroean.....	July 1-14.....	1	1	
Surabaya.....	do.....	8	7	

SMALLPOX.

Austria-Hungary:				
Austria—				
Prague.....	Aug. 20-Sept. 2.....	1	1	
Brazil:				
Rio de Janeiro.....	July 9-Aug. 19.....	55	8	
China:				
Hongkong.....	Aug. 6-Sept. 2.....	7	7	
Egypt:				
Cairo.....	May 7-27.....	78	28	
Port Said.....	do.....	2	2	
Germany:				
Konigsberg.....	Aug. 28-Sept. 2.....	1		
India:				
Bombay.....	Aug. 20-26.....	3	4	
Karachi.....	do.....	1	1	
Java:				East Java, July 1-21, 1916: Cases, 27; deaths, 1. Mid Java, July 1-21, 1916: Cases, 23; deaths, 7. West Java, July 14-27, 1916: Cases, 40; deaths, 4.
Russia:				
Moscow.....	July 16-Aug. 26.....	49	15	
Petrograd.....	July 30-Aug. 12.....	21	6	
Riga.....	May 1-31.....		1	
Straits Settlements:				
Singapore.....	Aug. 6-12.....	1		
Zanzibar:				
Zanzibar.....	May 12.....	1		From s. s. Dilmara.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended Oct. 13, 1916—Continued.

TYPHUS FEVER.

Place.	Date.	Cases.	Deaths.	Remarks.
Egypt:				
Cairo.....	May 7-27.....	413	177	
Port Said.....	do.....	18	9	
Java.....				Mid Java, July 1-14, 1916: Cases, 12; deaths 2.
Batavia.....	July 14-27.....	24	3	
Surabaya.....	July 1-7.....	1		
Russia:				
Moscow.....	July 16-Aug. 26.....	235	9	
Petrograd.....	July 30-Aug. 12.....	2	2	
Turkey in Asia:				
Haifa.....	July 10-23.....	53	24	

YELLOW FEVER.

Barbados.....	Sept. 17-23.....	3	2	
Mexico:				
Merida.....	Sept. 17-23.....	4	2	

Reports Received from July 1 to Oct. 6, 1916.

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
Austria-Hungary.....				Mar. 12-May 6, 1916: Cases, 425; deaths, 155.
Austria.....	Mar. 26-Apr. 8.....	2		
Do.....	July 9-15.....	1		
Bosnia-Herzegovina.....	Mar. 12-May 20.....	398	147	
Hungary.....	Mar. 20-Apr. 2.....	2		
Ceylon:				
Colombo.....	June 25-July 1.....	1	1	May 7-20, 1916: Cases, 43; deaths, 5, from s. s. Hong Kheng from Halfong; total to June 1: Cases, 61; deaths, 37. May 28-June 10, 1916: Cases, 19, from the port.
China:				
Dairen.....	Aug. 6-12.....	1		On s. s. Taihei Maru from Hong-kong and Chefoo.
Hongkong.....	Aug. 19.....			Present.
Egypt:				
Suez.....	May 18-20.....	5	2	From s. s. Pei-ho from Bombay.
Tor, quarantine station.....	May 22-June 3.....	112	42	Do.
Greece:				
Moschopolis.....	July 25-31.....	15	8	
India:				
Akyab.....	June 11-July 8.....		2	
Bassein.....	Apr. 23-June 10.....		3	
Bombay.....	May 14-July 1.....	21	9	
Do.....	July 2-Aug. 19.....	108	70	
Calcutta.....	May 7-July 1.....		259	
Do.....	July 2-Aug. 12.....		59	
Henzada.....	Apr. 23-July 22.....		7	
Madras.....	June 25-July 1.....	1	1	
Do.....	July 2-22.....	5	3	
Mandalay.....	July 23-29.....		1	
Pakokku.....	July 2-8.....		1	
Pegu.....	June 4-10.....		1	
Rangoon.....	May 24-July 20.....	13	9	
Indo-China.....				Dec. 1-31, 1915: Cases, 510; deaths, 395. Jan. 1-Mar. 31, 1916: Cases, 2,018; deaths, 1,100.
Provinces.....				
Anam.....	Dec. 1-31.....	493	388	
Do.....	Jan. 1-Mar. 31.....	1,753	1,024	
Cambodia.....	Jan. 1-Feb. 29.....	11	10	
Cochin-China.....	Jan. 1-Mar. 31.....	10	4	
Tonkin.....	Dec. 1-31.....	17	7	
Do.....	Jan. 1-Mar. 31.....	244	62	
Saigon.....	May 1-July 2.....	162	74	
Do.....	July 3-Aug. 5.....	45	28	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.**Reports Received from July 1 to Oct. 6, 1916—Continued.****CHOLERA—Continued.**

Place.	Date.	Cases.	Deaths.	Remarks.
Japan:				
Kobe	Aug. 30	46		
Nagasaki	Aug. 8-13	262	107	
Osaka	Aug. 30	353		
Yokohama	Aug. 15	6	5	55 cases, with 9 deaths in quarantine, from s. s. Hawaii Maru from Hongkong via ports.
Suburbs of city	Aug. 14-20	8	4	To date: Cases, 6; deaths, 5.
Java				
Batavia	Apr. 13-June 29		89	East Java, Apr. 8-June 30, 1916: Cases, 50; deaths, 35.
Do	July 7-13	16	12	Mid-Java, June 3-30, 1916: 30 cases, 26 deaths.
Malang	Apr. 8-14	2	2	West Java, Apr. 3-June 29, 1916: Cases, 661; deaths, 409.
Malang and Djombank	Apr. 25-May 5	2	2	July 7-13: Cases, 91; deaths, 61.
Surabaya residency	May 6-19	5	2	Including Malang, 2 cases, and Sidoarjo and Malang, 3 cases, with 2 deaths.
Korea.				
Chemulpo	Sept. 13	2		Sept. 23, 1916: In southern and central Korea, 108 cases.
Fusan	Sept. 2	1		
Persia:				
Asterabad	June 10			Present, with 4 or 5 deaths daily.
Enzeli	July 1-31	7	4	
Foumen	May 9	3	2	Previously erroneously included in cases at Reht.
Ghazian	June 13	2	1	
Kazvin	July 1-31	22	15	
Mohammerah	June 12			Present.
Reht	July 1-31	19	2	
Teheran	Sept. 1			Do.
Urumiah	July 1-31	25		
Philippine Islands:				
Manila	May 14-July 1	36	25	Not previously reported: Cases, 8; deaths, 1.
Do	Aug. 6-12	37	14	July 16-Aug. 12, 1916; Cases, 1,161; deaths, 627.
Provinces.				
Albay	July 2-Aug. 12	135	64	
Bataan	do	4	2	
Batangas	July 30-Aug. 12	14	7	
Bulacan	June 18-July 1	17	4	
Do	July 2-Aug. 12	527	245	
Cagayan	June 25-July 1	2	1	
Do	July 2-8	2		
Camarines	June 18-July 1	69	32	
Do	July 2-Aug. 12	709	447	
Cavite	June 11-July 1	14	11	
Do	July 2-Aug. 5	21	16	
Laguna	May 21-July 1	31	20	
Do	July 2-Aug. 12	93	64	
Mindanao	July 16-Aug. 5	19	11	
Misamis	July 16-Aug. 12	123	70	
Pampanga	July 9-Aug. 5	61	52	
Do	Aug. 6-12	11	11	
Rizal	May 21-July 1	11	9	
Do	July 2-Aug. 12	108	63	
Romblon	June 18-July 1	68	39	
Do	July 9-Aug. 12	16	13	
Tayabas	June 10-24	11	8	
Do	Aug. 6-12	1	1	
Siam:				
Bangkok	May 15-27	22	21	
Do	July 16-29	4	4	
Straits Settlements:				
Singapore	May 27-June 24	8	3	
Turkey in Europe:				
Constantinople	May 19-July 6	113	63	Present among soldiers June 14.
Turkey in Asia:				
Adana	June 16-July 9	106	60	
Aleppo	June 15-25	47	16	
Bagdad	June 15-July 5	78	18	
Beirut	July 14-19	39	17	
Damascus	June 16-July 3	77	50	
Jaffa	June 17-July 26	166	67	
Smyrna	June 15-28	22	13	Epidemic. Estimated number cases daily, 50.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to Oct. 6, 1916—Continued.

CHOLERA—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
At sea:				
Steamship Hong-Kheng....	Apr. 27-May 9....	17	14	En route from Haifong, Indo-China, to Colombo.
Steamship Pei-ho.....	Apr. 19-30.....	1	1	From Saigon, Indo-China, for Colombo.
Do.....	May 5-17.....	8	8	From Colombo for Suez.

PLAGUE.

Ceylon:				
Colombo.....	Apr. 30-July 1....	49	46	
Do.....	July 2-22.....	28	25	
Chile:				
Mejillones.....	May 28-June 3....	1	.....
Antofagasta.....	June 4-July 22....	2	.....
China:				
Amoy.....	July 16-Aug. 5....	.....	.....	Present.
Hongkong.....	May 28-June 30....	7	7	
Do.....	July 23-Aug. 5....	2	2	
Ecuador:				
Ambato.....	May 1-31.....	.....	.....	Epidemic.
Bahia.....	do.....	.....	.....	Country district, vicinity of Bahia.
Daule.....	June 1-30.....	4	2	
Guayaquil.....	May 1-June 30....	10	3	
Manta.....	May 1-31.....	.....	.....	Country district, vicinity of Manta.
Egypt				
Alexandria.....	May 26-Aug. 24....	44	27	Jan. 1-Aug. 31, 1916: Cases, 1,690; deaths, 823. Jan. 1-June 29, 1916: Cases, 1,634; deaths, 792.
Cairo.....	July 10.....	1	.....	Imported.
Port Said.....	May 28-June 28....	8	5	
Do.....	July 20-Aug. 3....	5	4	
Provinces—				
Assiout.....	May 27-June 29....	9	8	
Beni-Souef.....	May 26-June 25....	34	15	
Do.....	July 1-10.....	2	1	
Fayoum.....	May 26-June 30....	112	45	
Do.....	July 1-Aug. 3....	9	2	
Galloubeh.....	June 7.....	1	.....
Girgeh.....	June 9-21.....	3	1	
Do.....	July 7-10.....	7	7	
Menoufieh.....	June 12-30.....	9	4	
Do.....	July 1-31.....	5	3	
Minieh.....	May 29-June 30....	37	14	
Do.....	July 3-10.....	5	2	
Great Britain:				
Bristol.....	Aug. 18-31.....	3	.....
Hull.....	Aug. 19-31.....	2	1	
Liverpool.....	Sept. 22.....	3	.....
Greece:				
Island of Chios—				
Mitylene.....	Sept. 29.....	.....	.....	Present.
Volo.....	do.....	.....	.....	Slight epidemic.
India:				
Bassein.....	Apr. 23-July 29....	.....	242	May 7-Aug. 12, 1916: Cases, 12,118; deaths, 8,810. ¹
Bombay.....	May 14-July 1....	280	264	
Do.....	July 2-Aug. 12....	86	76	
Calcutta.....	May 7-July 1....	.....	14	
Benzada.....	Apr. 23-July 1....	.....	14	
Do.....	July 9-22.....	.....	4	
Karachi.....	May 14-July 1....	72	61	
Do.....	July 2-15.....	1	3	
Madras Presidency.....	May 14-June 24....	139	94	
Do.....	July 9-Aug. 19....	602	405	
Mandalay.....	May 14-June 3....	.....	1	
Moulmein.....	Apr. 23-June 10....	.....	37	
Do.....	July 2-29.....	.....	69	
Pegu.....	June 11-July 15....	.....	3	
Prome.....	Apr. 23-May 20....	.....	1	
Do.....	July 2-29.....	.....	39	
Rangoon.....	Apr. 23-July 1....	467	440	Apr. 16-22, 1916: Cases, 54; deaths, 52.
Do.....	July 2-Aug. 12....	187	172	
Toungoo.....	June 25-July 1....	.....	2	
Do.....	July 9-29.....	.....	9	

¹ Reports for week ended May 20 and 27, 1916, not received.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.**Reports Received from July 1 to Oct. 6, 1916—Continued.****PLAGUE—Continued.**

Place.	Date.	Cases.	Deaths.	Remarks.
Indo-China				Dec. 1-31, 1915: Cases, 90; deaths, 70. Jan. 1-Mar. 31, 1916: Cases, 290; deaths, 191.
Provinces—				
Anam.....	Dec. 1-31.....	36	20	
Do.....	Jan. 1-Mar. 31.....	131	93	
Cambodia.....	Dec. 1-31.....	27	36	
Do.....	Jan. 1-Feb. 29.....	77	71	
Cochin China.....	Dec. 1-31.....	4	1	
Do.....	Jan. 1-Mar. 31.....	82	27	
Tonkin.....	Dec. 1-31.....	23	23	
Saigon.....	May 15-July 2.....	55	30	
Do.....	July 24-Aug. 12.....	7	3	
Java:				
Residences—				
Kediri.....	Apr. 9-May 19.....	18	18	
Pasoeroean.....	Apr. 9-June 30.....	13	12	
Surabaya.....	do.....	28	25	
Surakarta.....	do.....	15	24	
Japan:				
Taiwan—				
Tamsui.....	July 15-22.....	2	2	17 miles from capital city.
Mauritius.....	Apr. 15-June 21.....	6	8	
Persia:				
Recht.....	May 2-19.....	20	14	
Siam:				
Bangkok.....	Apr. 30-July 1.....	66	59	
Do.....	July 2-29.....	29	23	
Straits Settlements:				
Singapore.....	Apr. 30-July 1.....	5	1	
Do.....	July 2-Aug. 5.....	1	4	
Union of South Africa:				
Orange Free State.....	Jan. 23-Mar. 26.....	36	23	Remaining under treatment Mar. 26, 6 cases.

SMALLPOX.

Australia:				
New South Wales.				Aug. 4-17, 1916: Cases, 6.
Anglepool.....	July 21-Aug. 3.....	1		
Guildford.....	June 9-22.....	2		
Lake Macquarie.....	Aug. 4-17.....	2		
Narrabri.....	May 26-June 7.....	8		
Do.....	July 7-Aug. 17.....	19		
Swansea.....	Aug. 4-17.....	1		
Sydney.....	June 23-30.....	1		
Do.....	July 1-Aug. 3.....	4		
Tamworth.....	June 9-22.....	1		
Do.....	July 7-20.....	1		
Walgett.....	July 21-Aug. 3.....	6		
Austria-Hungary:				
Austria				Feb. 13-May 20, 1916: Cases, 2,175.
Galicia, Province.....	Apr. 23-May 29.....	464		
Prague.....	July 2-Aug. 19.....	4	1	
Vienna.....	May 27-July 1.....	4	1	
Do.....	July 9-Aug. 5.....	3		
Hungary—				
Budapest.....	May 21-July 1.....	33	15	
Do.....	July 2-8.....		1	
Brazil:				
Bahia.....	July 2-Aug. 26.....	8	8	
Para.....	July 2-8.....		4	
Rio de Janeiro.....	Apr. 9-June 17.....	94	18	
Santos.....	May 8-14.....		1	
British East Africa:				
Mombasa.....	Apr. 24-May 31.....	4	2	
Do.....	July 1-31.....		1	
Canada:				
Ontario—				
Fort William and Port Arthur.....	July 9-15.....	1		
Niagara Falls.....	July 2-8.....	1		
Toronto.....	June 25-July 29.....	3		
Ceylon:				
Colon:bo.....	May 7-June 3.....	4		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to Oct. 6, 1916—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Antung.....	May 22-June 18....	2	1	
Chungking.....	May 7-June 24.....			
Do.....	July 2-Aug. 21.....			Present.
Dairen.....	May 21-July 1.....	2	1	Do.
Do.....	July 16-Aug. 26....	3	2	
Foochow.....	May 7-27.....			Do.
Do.....	July 2-Aug. 5.....			Do.
Harbin.....	May 2-June 18.....	3	1	
Do.....	July 9-Aug. 6.....	1	2	
Hongkong.....	May 7-June 24.....	68	50	
Do.....	July 2-Aug. 5.....	7	6	
Nanking.....	June 11-Aug. 19....			Do.
Tientsin.....	May 14-July 1.....	45	11	
Do.....	July 2-29.....	3	1	
Egypt:				
Alexandria.....	May 28-June 17....	4	2	
Cairo.....	Jan. 22-May 6.....	106	29	
Port Said.....	Mar. 12-May 6.....	4	4	
France:				
Paris.....	May 14-July 1.....	9		
Do.....	July 2-8.....	1		
Germany:				
Breslau.....	May 21-27.....	1		
Hamburg.....	June 11-17.....	1		
Königsberg.....	July 2-8.....	3		
Great Britain:				
Cardiff.....	June 4-17.....	1	1	
London.....	do.....	1		
Southampton.....	July 31-Aug. 5.....	1		
Greece:				
Athens.....	Apr. 1-June 13....	178	37	
Do.....	July 9-23.....			Present. Estimated occurrence, 10 cases weekly.
India:				
Bassein.....	May 7-June 10.....		2	
Bombay.....	May 14-July 1.....	153	79	
Do.....	July 2-Aug. 19.....	41	27	
Calcutta.....	May 7-June 3.....		3	
Do.....	July 2-Aug. 5.....		2	
Karachi.....	Aug. 6-12.....	1		
Madras.....	May 14-July 1.....	139	42	
Do.....	July 2-Aug. 19.....	81	43	
Rangoon.....	Apr. 23-July 1....	260	135	
Do.....	July 2-29.....	10	5	
Indo-China:				
Provinces—				
Anam.....	Dec. 1-31.....	48		
Do.....	Jan. 1-Mar. 31....	68	5	
Cambodia.....	Dec. 1-31.....	19	13	
Do.....	Jan. 1-Mar. 31....	38	14	
Cochin China.....	Dec. 1-31.....	1	1	
Do.....	Feb. 1-Mar. 31....	23	2	
Tonkin.....	Dec. 1-31.....	6		
Do.....	Jan. 1-Mar. 31....	270	6	
Saigon.....	July 24-Aug. 13....	4	4	
Japan:				
Kobe.....	May 29-June 25....	24	4	
Do.....	July 24-Sept. 3....	11	2	
Nagasaki.....	June 26-July 2....	1	1	
Java:				
Batavia.....	Apr. 13-June 29....	31	9	
Do.....	June 30-July 13....	6	4	
Samarang.....	May 13-19.....	2	2	
Surabaya.....	May 9-June 16....	2	1	
East Java, Apr. 8-June 30: Cases, 88; deaths, 11. Mid-Java, Apr. 1-June 30, 1916: Cases, 233; deaths, 47. West Java, Apr. 13-June 29, 1916: Cases, 278; deaths, 59. June 30-July 13: Cases, 104; deaths, 17.				
Malta:				
Malta.....	Apr. 1-30.....	7	1	
Mexico:				
Agascalientes.....	June 12-July 2....		33	
Do.....	July 3-Sept. 10....		33	
Frontera.....	May 28-June 10....	4	1	
Guadala'ara.....	June 11-17.....	35	9	
Ma'atlan.....	May 31-June 6....		4	
Tenosique.....	June 14.....			175 miles south of Frontera:
Vera Cruz.....	June 4-July 2.....		9	Epidemic among troops.
Do.....	July 3-Sept. 3.....		4	

**CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW
FEVER—Continued.**

Reports Received from July 1 to Oct. 6, 1916—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Netherlands:				
Amsterdam.....	May 28-June 3.....	1		
Philippine Islands:				
Manila.....	do.....	1		
Do.....	July 1-8.....	3		
Porto Rico:				June 19-25, 1916: Cases, 33.
Aguas Buenas.....	June 19-25.....	5		
Arceibo.....	do.....	2		
Do.....	Aug. 7-13.....	1		
Bayamon.....	June 19-July 2.....	2		
Naranjito.....	June 25-July 2.....	4		
Rio Piedras.....	do.....	1		
San Juan.....	do.....	21		
Toa Alta.....	do.....	12		
Portugal:				
Lisbon.....	May 21-July 1.....	15		
Do.....	July 9-Aug. 26.....	9		
Russia:				
Moscow.....	Apr. 30-July 1.....	222	59	
Do.....	July 2-15.....	23	127	
Riga.....	Apr. 6-12.....	1		
Do.....	July 1-22.....	2		Apr. 1-30, 1916: 1 case.
Petrograd.....	Apr. 23-July 1.....	162	35	
Do.....	July 2-30.....	32	9	
Siam:				
Bangkok.....	May 24-30.....	2		
Spain:				
Cadiz.....	July 1-31.....		1	
Madrid.....	May 1-31.....		13	June 1-30, 1916: Cases, 10.
Do.....	July 1-31.....		17	
Malaga.....	May 1-31.....		7	
Seville.....	June 1-30.....		3	
Valencia.....	May 21-July 1.....	12	4	
Do.....	July 8-Aug. 19.....	7		
Straits Settlements:				
Penang.....	May 14-20.....	3		
Singapore.....	Apr. 30-July 1.....	5	3	
Do.....	July 16-Aug. 5.....	2	2	
Switzerland:				
Basel.....	May 13-July 1.....	29		
Do.....	July 2-15.....	9		
Union of South Africa:				
Durban.....	June 1-30.....	1		
Johannesburg.....	May 28-June 3.....	1		
Venezuela:				
Maracaibo.....	Sept. 2-8.....		2	
At sea:				
Steamship Katuna.....				Case of smallpox landed at Colombo, Ceylon, May 12, 1915. Vessel arrived May 27 at Fremantle, Australia, was ordered to quarantine, and proceeded to Melbourne direct for disinfection.

TYPHUS FEVER.

Austria-Hungary:				
Austria:				
Galicja, province.....	Apr. 22-May 20.....	1,311		Feb. 13-May 20, 1916: Cases, 2,407.
Vienna.....	July 2-15.....	3		
Hungary:				
Budapest.....	May 21-June 24.....	14	2	Feb. 21-Mar. 5, 1916: Cases, 35; deaths, 7.
Do.....	July 2-Aug. 12.....	3		
Belgium:				
Liege.....	Aug. 12-19.....		1	
Canada:				
New Brunswick—				
St. John.....	July 29.....	4		
Canary Islands:				
Santa Cruz de Tenerife.....	July 31-Aug. 5.....		1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to Oct. 6, 1916—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Antung.....	June 19-25.....	1	1	
Do.....	July 22-Aug. 27.....	3		
Harbin.....	May 2-8.....	1		
Do.....	July 3-16.....	1		
Tientsin.....	May 14-20.....		1	
Egypt:				
Alexandria.....	May 21-July 1.....	235	93	
Do.....	July 2-Aug. 26.....	143	66	
Cairo.....	Jan. 8-May 6.....	487	223	
Port Said.....	Mar. 18-May 6.....	23	12	
Germany:				
Aix la Chapelle.....	July 2-Aug. 12.....		2	
Barmen.....	Aug. 13-19.....		1	
Berlin.....	June 18-24.....		1	
Do.....	July 16-Aug. 19.....		8	
Bremen.....	July 16-Aug. 12.....	6		
Breslau.....	Aug. 15-21.....	3		
Chemnitz.....	May 28-June 3.....		1	
Frankfort on Main.....	June 11-17.....		1	
Hanover.....	May 7-27.....	4	1	
Do.....	July 1-29.....	3		
Königsberg.....	June 4-10.....	1		
Do.....	July 9-Aug. 26.....	13		
Leipzig.....	June 4-10.....		1	
Stettin.....	July 16-Aug. 19.....		3	
Great Britain:				
Belfast.....	July 16-Sept. 9.....	12	4	
Glasgow.....	July 9-Aug. 12.....	8	6	
Greece:				
Saloniki.....	May 1-July 2.....		61	
Do.....	July 3-Aug. 14.....		41	
Italy:				
Palermo.....	June 29-July 5.....	1	1	
Japan:				
Hakodate.....	July 16-22.....	2		
Tokyo.....	May 22-July 25.....	114		
Java:				
Batavia.....	Apr. 13-June 29.....	46	13	
Do.....	July 7-13.....		1	
Samarang.....	Apr. 1-June 30.....	20	8	
Surabaya.....	Apr. 8-May 12.....	6	6	
Mexico:				
Aguascalientes.....	June 12-July 2.....		32	
Do.....	July 3-Sept. 10.....		139	
Chihuahua.....	Sept. 7.....	40		Sept. 20: Estimated number of cases, 100.
Durango.....	Sept. 1.....			Present.
Juarez.....	Sept. 7-20.....	13		
Guadalajara.....	June 11-17.....	4	1	
Vera Cruz.....	June 4-9.....		2	
Do.....	July 24-Aug. 6.....		7	
Zacatecas, State.....				Sept. 7: Prevalent.
Netherlands:				
Rotterdam.....	July 30-Aug. 5.....		1	
Norway:				
Bergen.....	do.....		1	
Russia:				
Moscow.....	Apr. 30-July 1.....	909	52	
Do.....	July 9-15.....	19	3	
Petrograd.....	Apr. 23-July 1.....	59	13	
Do.....	July 3-30.....	12	2	
Sweden:				
Stockholm.....	June 21-27.....	1		
Do.....	July 9-29.....	5		
Switzerland:				
Basel.....	July 24-Aug. 13.....	5		
Geneva.....	May 21-27.....	1		
Zurich.....	July 23-Sept. 2.....	5		
Turkey in Asia:				
Adana.....	May 13-June 25.....			Present.
Do.....	July 2-8.....			Do.
Bagdad.....	June 27.....			Do.
Haifa.....	Apr. 24-June 11.....	35	13	
Jaffa.....	Apr. 23-June 25.....		47	Mar. 19-Apr. 1, 1916: Present.

**CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW
FEVER—Continued.**

Reports Received from July 1 to Oct. 6, 1916—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Turkey in Asia—Continued.				
Mersina.....	May 7-June 25....	9		Apr. 2-8, 1916: Cases, 3. May 6-20: Many cases.
Do.....	July 2-8.....			Do.
Tarsus.....	May 13-27.....			Present.
Do.....	July 2-8.....			Do.
Trebizond.....	Aug. 6-12.....	3	1	

YELLOW FEVER.

Ecuador:				
Babahoyo.....	June 1-30.....	2		
Guayaquil.....	May 1-June 30....	76	51	
Milagro.....	June 1-30.....	1	1	
Mexico:				
Merida.....	July 1-Sept. 9....	21	5	
Progreso.....	Aug. 13-Sept. 2...	2	1	

SANITARY LEGISLATION.

COURT DECISIONS.

NEW JERSEY COURT OF CHANCERY.

Venereal Disease—Annulment of Marriage—Evidence not Sufficient to Prove that Defendant Knew that He was Suffering from Syphilis and Fraudulently Concealed that Fact.

KAUFMAN *v.* KAUFMAN. (Apr. 1, 1916.)

The fact that one party to a marriage was afflicted with syphilis at the time of the marriage is not sufficient to enable a court to annul the marriage. Complainant sought to have her marriage annulled on the ground that the defendant (her husband) had fraudulently concealed from her the fact that at the time of the marriage he was suffering from syphilis. The court decided that the evidence was not sufficient to prove that the defendant knew when the marriage occurred that he had syphilis and that he had fraudulently concealed that fact.

[97 Atlantic Reporter, 490.]

FOSTER, V. C. This bill is filed to have the marriage between complainant and defendant annulled upon the ground that at the time of the marriage defendant fraudulently suppressed the fact that he was then afflicted by the disease called syphilis. The special master to whom the cause was referred reported adversely to complainant's claim, and the matter comes before the court on exceptions to the master's report. The evidence shows the parties met in Atlantic City in August, 1906, and in a few weeks became engaged. Complainant was then a resident of Newark and defendant lived in Jacksonville, Fla.

In the fall of 1906 defendant came to Newark and the parties were married on November 1 of that year. A few days before the wedding defendant consulted Dr. Max Feldman, a physician practicing in Newark, a stranger to him, but an old friend of complainant and her family, in regard to a sore on his lip. From his examination the physician found a sore which he says might have been a usual sore or syphilitic, and he suspected it to be a syphilitic sore. He told defendant of his suspicion and he denied that he had been exposed to syphilis. The doctor accused him of kissing some girls he should not have kissed and defendant denied doing so. Although he knew defendant was about to marry complainant he did not tell her or her family of his suspicions regarding the nature of the sore, because he states he did not know enough of the facts and did not have sufficient grounds to justify anything and he might have done defendant a very grave injustice.

From the evidence of the two physicians who testified for complainant it appears this disease can be contracted in many ways by a person innocent of wrongdoing; e. g., by kissing a person afflicted, or by using a drinking cup, and in other ways mentioned in their testimony, and that it was possible at the time Dr. Feldman examined defendant for him to have had syphilis and be honest in his belief and denial that he did not have it.

It further appears from the progress of the disease in defendant's case that he was undoubtedly syphilitic when he consulted Dr. Feldman, and it also appears that some years after this consultation a blood test was made and defendant was pronounced by a specialist as positively afflicted with the disease, although he strongly denied it.

The parties lived together, no children being born of the marriage, until September, 1914, when complainant, convinced, notwithstanding defendant's repeated denials, that he was suffering from this disease, left him and returned to her parents' home in Newark, and they have not lived together or communicated with each other since.

The jurisdiction of this court to annul a marriage for fraud was determined by the Court of Errors and Appeals in *Carris v. Carris*, 24 N. J. Eq., 516, and on this authority Chancellor Magie, in *Crane v. Crane*, 62 N. J. Eq., 21, 49 Atl., 734, granted a decree of annulment because of the husband's concealment of his syphilitic condition at the time of his marriage and of his knowingly false denial of his condition prior to the marriage when asked about it.

As stated, the evidence is convincing that defendant was affected with syphilis at and before the time of the marriage, but it was held by the learned chancellor, at page 27 of 62 N. J. Eq., at page 736 of 49 Atl., in the *Crane* case, that:

The mere existence of that foul disease (syphilis) in one of the parties to a marriage contract, although it tended to render, and upon discovery would render, impracticable the purpose of marriage, would not, in my judgment, justify a decree annulling the marriage.

And he added:

It must therefore, in my judgment, appear by appropriate and sufficient proof that the defendant either represented to complainant that he was free from syphilis or that he concealed the fact that he had syphilis when he was in duty bound to disclose it.

Complainant's case rests upon the assumption that, as it afterwards developed by the progress of the disease, that defendant was syphilitic, and that the disease in 1914 had reached a stage that clearly indicated that it had been contracted prior to the marriage, defendant must have known, when he consulted Dr. Feldman, the nature and cause of the sore upon his lip, and that having such knowledge he fraudulently concealed the fact from the complainant when it was his duty to disclose it.

The evidence does not support this assumption. On the contrary, defendant denied to the physician that he had the disease, or that he had been exposed to it. The physician from his examination was suspicious that the sore was syphilitic, but was not certain about it and did not feel he had sufficient facts on which to base an opinion or to justify him in communicating his suspicion to complainant or her family. It is established that the disease can be contracted innocently of wrongdoing, and one not a physician might be affected with syphilis in its earlier stages, at least, and not know it. Because of the possibility that defendant may have contracted the disease innocently, and the further possibility that he could have the disease in its initial stage and not know it, I am unable to find anything to warrant me in determining that the only and the correct assumption arising from the evidence is that at the time of the marriage and prior thereto defendant knew, or must have known, that he had syphilis, and that having such knowledge he concealed the fact from the complainant.

For the reasons stated, my conclusion is that the exceptions to the master's report should be overruled.

STATE LAWS AND REGULATIONS PERTAINING TO PUBLIC HEALTH.

DELAWARE.

Poliomyelitis—Notification of Cases—Entrance of Children into State. (Reg. Bd. of H., Aug. 9, 1916.)

The State Board of Health of Delaware hereby issues the following rules and regulations to remain in force until ordered discontinued by the secretary of this board:¹

First. All rules and regulations governing contagious diseases shall be rigidly enforced.

Second. No child under 16 years of age coming from New York, New Jersey, or Pennsylvania shall enter the State of Delaware without having a certificate, or clean bill of health, so far as anterior poliomyelitis (infantile paralysis) is concerned. Said certificate must be issued by a constituted health official of the State or city or town or county from which said person comes, and said certificate must contain the full name, age, and residence of said person and the place of destination.

Third. Children under 16 years of age bearing certificates from health authorities certifying that they are from noninfected districts and free from infantile paralysis, and have not been in contact with infantile paralysis, and have not been in premises in which there is or has been a case of infantile paralysis during the present epidemic, shall be allowed entrance into the State without any further formalities.

Fourth. Children under 16 years of age whose certificates from health authorities show that they have been living in premises in which there is or has been a case of infantile paralysis during the present epidemic only when such certificates show that they have been under supervision of the health authorities for at least 14 days and have been regularly discharged, shall be allowed entrance in the State without any further formalities.

Fifth. Children under 16 years of age whose certificates show that they have come from stricken districts shall be allowed entrance into the State without any further formalities, after securing the local address in the stricken district, exact destination, the name of the householder at destination, and the name of the traveling companion, and if traveling by automobile the State and license number.

Sixth. Children 16 years of age and under whose certificates show that they have had the disease during the present epidemic shall be allowed entrance into the State without any further formalities only when such certificates show that they have been under quarantine supervision for at least 30 days and that they have been regularly discharged by the health authorities, and in every such case will secure the exact destination, the name of the householder at point of destination, and the names of the traveling companions, and if traveling by automobile the State and license number.

¹ These rules were discontinued Oct. 4, 1916.

Seventh. Stamp all satisfactory certificates "Pass," date, and sign your name.

Eighth. Persons who do not meet the requirements of these rules and regulations must be returned across the State line, taking the shortest way from the point at which they are held up, but they may be set at liberty outside of Delaware after having taken their names and addresses.

Ninth. If any person or persons should resist and attempt to come into Delaware against the above orders they shall be arrested. If an adult or adults who have charge of any children under 16 years of age, said adult or adults shall be taken, together with the children, before the nearest magistrate and make information against them for violation of chapter 25, article 1, section 738, of the Laws of Delaware.

Tenth. In case the magistrate should commit any such adult to the county jail, and there is no way for the children to be returned, communicate at once with the State board of health, who will make arrangements for the further disposition of said children.

Eleventh. Persons who have been temporarily at large hotels or apartment houses in which there is or has been a case of infantile paralysis will not be considered as having lived in premises in which there is or has been a case of infantile paralysis, unless in the opinion of the health authorities issuing the certificate they may have been actually exposed and such fact is specially noted on the certificate.

Twelfth. Any infantile-paralysis certificate issued by the State Board of Health of Delaware or a health official of Delaware shall be valid for returning to the State of Delaware for one day from the date of its issue. Such certificate is good for both leaving and returning to the State.

Thirteenth. Delaware physicians shall immediately notify the State Board of Health of Delaware by telephone (reverse) or telegraph (collect) of any case of anterior poliomyelitis (infantile paralysis) coming under their care or observation. Said notice must be followed by the regular postal-card report.

Fourteenth. The secretary of the State Board of Health of Delaware may, with the approval of the president of said board, issue further rules and regulations as may be further expedient or necessary to control and stamp out anterior poliomyelitis (infantile paralysis).

NEW YORK.

State Department of Health—Appropriations for Fiscal Year Ending June 30, 1917. (Ch. 646, Act May 20, 1916.)

SECTION 1. The several amounts named in this section, or so much thereof as shall be sufficient to accomplish the purposes designated by the appropriations, are hereby appropriated and authorized to be paid as hereinafter provided, to the respective public officers and for the several purposes specified, which amounts shall be available for the year beginning on the 1st day of July, 1916, namely :

* * * * *

DEPARTMENT OF HEALTH—EXCLUSIVE OF DIVISION OF LABORATORIES AND RESEARCH.

For payment for services of employees of the department of health, exclusive of the division of laboratories and research :

PERSONAL SERVICE.

Division of administration:

Executive—	
Salaries, regular—	
Commissioner of health.....	\$8,000
Deputy commissioner.....	5,000
Secretary.....	4,000
Executive clerk.....	4,000
Hearing stenographer.....	2,700
Stenographer.....	1,320
* * * * *	*
Stenographer or clerk.....	900
Stenographer or clerk, 2 at \$540.....	1,080
Clerk.....	1,200
Clerk, 2 at \$900.....	1,800
Clerk.....	720
Clerk or stenographer.....	600
Clerk or messenger.....	480
Telephone operator.....	720
Relief telephone operator and clerk.....	480
Legal—	
Salaries, regular—	
Counsel.....	4,000
Audit and supply—	
Salaries, regular—	
Audit clerk.....	1,800
Clerk.....	720
Supply clerk.....	1,800
Laborers, 2 at \$720.....	1,440
Sanitary supervisors—	
Salaries, regular—	
District sanitary supervisors, 10 at \$3,000.....	30,000
Stenographer.....	1,000
* * * * *	*
Supervising nurses—	
Salaries, regular—	
* * * * *	*
Public health council:	
Salaries, regular—	
Members, 6 at \$1,000.....	6,000
Division of sanitary engineering:	
Executive—	
Salaries, regular—	
Chief engineer.....	5,000
Principal assistant engineer.....	3,250
Stenographers, 2 at \$1,200.....	2,400
Field investigations and reports—	
Salaries, regular—	
Assistant sanitary engineers, 2 at \$2,500.....	5,000
Assistant sanitary engineers, 3 at \$2,000.....	6,000
Inspecting engineer.....	1,800
Stenographer or draftsman.....	900
Stenographer.....	720
Stenographer or typist.....	600

Division of vital statistics:

Executive—

Salaries, regular—

Director	\$4,000
Stenographer	1,200
Stenographer	720

Statistics—

Salaries, regular—

Statistical clerk	1,650
Junior statistician	1,200
* * * * *	*
Clerk	1,200
Clerk	900
Stenographer or clerk	480

Record—

Salaries, regular—

Clerk, or statistical clerk	1,800
Clerks, 2 at \$1,080	2,160
Clerks, 3 at \$720	2,160
Clerks, 2 at \$480	960
Stenographer or clerk	600
Stenographers, 2 at \$480	960
Typewriter copyist	900
Typewriter copyist	480

Division of public health education:

Salaries, regular—

Supervisor of exhibits	2,400
Proof reader	1,200
Stenographer	900
Parochial school lecturer	1,000
Laborer	900
Laborer	720

Division of child hygiene:

Executive—

Salaries, regular—

Director	4,000
Stenographer	900
Stenographer or clerk	600

Inspection and instruction—

Salaries, regular—

Supervising nurses, 2 at \$1,200	2,400
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Division of communicable diseases:

Executive—

Salaries, regular—

Director	4,000
Stenographer	900
Stenographer	720

Investigation—

Salaries, regular—

Medical expert on contagious diseases	2,400
Supervising nurses, 2 at \$1,200	2,400

Division of communicable diseases—Continued.

Statistical—

Salaries, regular—

Clerk	\$720
Clerk	600

Records—

Salaries, regular—

Clerk	720
Stenographers or clerks, 2 at \$600	1, 200
Typewriter copyist	600

Tuberculosis—

Salaries, regular—

Medical expert on tuberculosis	3, 000
Public-health nurses, 2 at \$1,200	2, 400
Stenographer	900
Clerk	720

Division of cold-storage inspection:

Executive—

Salaries, regular—

Supervising inspector	2, 500
Stenographer	1, 200
Laborer	720

Inspection—

Salaries, regular—

Inspectors, 8 at \$1,200	9, 600
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MAINTENANCE AND OPERATION.

For the expenses of maintenance and operation of the department of health, other than personal service, exclusive of laboratories and research:

Printing, of which not more than \$5,000 may be used for the publication and distribution of "Health News" and "Health Hints"	\$35, 000
Equipment:	
Office, exhibits, books, and engineering	8, 000
Supplies	4, 000
Traveling expenses	40, 000
Communication:	
Postage, express, freight, carting, telephone, and telegraph	12, 000
General plant service	700
Rent	1, 500

DEPARTMENT OF HEALTH—DIVISION OF LABORATORIES AND RESEARCH.

For the payment of services of employees of the division of laboratories and research of the department of health:

Administration:

General—

Salaries, regular—

Director	\$4,000
* * * * * *	*
Assistant bacteriologist	1, 500

Branch laboratory, New York City:

Salaries, regular—

Assistant bacteriologist	\$1,500
Assistant bacteriologist	1,200
Laboratory assistant	600
Laboratory apprentice	720
Technical assistant	660
Stenographer	480

Diagnostic laboratory, bacteria diagnosis:

Salaries, regular—

Bacteriologist	2,000
Assistant bacteriologist	1,500
Laboratory assistant	1,200
Laboratory assistant	720
Laboratory assistant	720

Diagnostic laboratory, serum diagnosis:

Salaries, regular—

Assistant serologist	1,500
Assistant serologist	1,200
Laboratory assistant, 2 at \$720	1,440
Laboratory apprentice	600

Preparation and distribution antitoxins and serums:

Salaries, regular—

Bacteriologist	1,800
Laboratory assistant	1,200
Laboratory assistant	960
Laboratory assistant, 2 at \$720	1,440
Laboratory apprentice	600
Technical assistant	540
Physiological chemist	2,500
Physiological chemist	1,500
Page	360

Preparation and distribution bacterial vaccines:

Salaries, regular—

Assistant bacteriologist, 2 at \$1,500	3,000
Laboratory assistant	1,200
Junior clerk	480

Preparation of smallpox vaccine:

Salaries, regular—

Assistant bacteriologist	1,200
Laboratory apprentice	600
Page	360

Examination samples of water:

Samples, regular—

Chemist	2,800
Water analyst	1,800
Water analyst	1,600
Laboratory assistant	1,200
Laboratory assistant, 2 at \$900	1,800

Office:

Salaries, regular—

Stenographer	1,200
Bookkeeper or storekeeper	840
Stenographer, 2 at \$900	1,800

Office—Continued.**Salaries, regular—Continued.**

Stenographer	\$720
Typewriter copyist.....	600
Filing clerk.....	480
Junior clerk, 2 at \$480.....	960
Junior clerk.....	420
Page	360

Media preparation and sterilization:**General—****Salaries, regular—**

Technical assistant.....	900
Technical assistant.....	600
Laboratory apprentice.....	600

Cleaners, laborers, etc.:**Wages, regular—**

Cleaner	720
Cleaner, 4 at \$600.....	2,400
Cleaner, 5 at \$540.....	2,700
Cleaner, 2 at \$480.....	960
Cleaner, 2 at \$420.....	840
Stableman	1,200
Assistant stableman.....	720
Assistant stableman.....	360
Laborer, 5 at \$720.....	3,600
Laborer	660
Laborer, 2 at \$600.....	1,200
Laborer	540

MAINTENANCE AND OPERATION.

For the expenses of maintenance and operation of the division of laboratories and research of the department of health, other than personal service:

Fuel, light, power, and water:

Coal, gas and electricity, and water.....	\$2,650
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Printing	1,500
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Equipment:

Office, household, medical and surgical, motorless vehicles, motor vehicle, wearing apparel, laboratory and research, farm and garden, live stock, and books.....	9,500
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Supplies:

Office, household, laundry, cleaning and disinfecting, motor vehicle, botanical and agricultural, research, forage and veterinary, refrigerating, and general plant.....	16,900
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Traveling expenses.....	1,000
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Communication:

Postage, express, freight and cartage, telephone and telegraph.....	2,200
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General plant service.....	350
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Rent	480
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Town Physicians—Appointment, Duties, and Salaries. (Ch. 413, Act. May 3, 1916.)

SECTION 1. Chapter 63 of the laws of 1909, entitled "An act relating to towns, constituting chapter 62 of the consolidated laws," is hereby amended by adding thereto, at the end of article 6, a new section to be section 142, to read as follows:

SEC. 142. *Town physician.*—The town board of any town containing a village or hamlet in which there is not a practicing physician residing within its boundaries or within a radius of 8 miles thereof may, at a special meeting called for that purpose, establish the office of town physician and fix the salary of such physician at not more than \$1,000 per annum, and appoint to the office so created a duly qualified physician upon condition that he shall reside in such village or hamlet. The compensation of such town physician shall be a town charge and the sum necessary to pay the same shall be levied, collected, and paid at the time and in the manner that other charges against the town are levied, collected and paid. It shall be the duty of a town physician so appointed to render to all poor persons within the town medical relief and attendance when requested so to do by the superintendent of the poor of the county in which the town is situated, or the supervisor of the town or an overseer of the poor of the town. If such town physician is also a local health officer he shall receive in addition the compensation of such officer as provided by law.

Mosquitoes—Extermination—County Commissions—Appointment, Powers, and Duties. (Ch. 408, Act May 3, 1916.)

SECTION 1. Article 18 of chapter 49 of the laws of 1909, entitled "An act in relation to the public health, constituting chapter 45 of the consolidated laws," as renumbered article 21 by chapter 630 of the laws of 1913, is hereby renumbered article 22, and such chapter is hereby amended by inserting therein a new article 21, to read as follows:

ART. 21. SEC. 400. *Establishment; appointment of commissioners.*—In any county of the State of New York having a population of less than 200,000 adjacent to a city of the first class having a population of over 3,000,000 there is hereby created an appointing board to consist of the county judge, the county clerk, and the county comptroller, to be known as "The (here shall be inserted the name of the county in and for which such appointing board shall act) county board" for the appointment of a county mosquito extermination commission, as hereinafter provided. The members of such appointing board shall serve without pay, except that the necessary expenses of each member for actual attendance at any meeting of such board shall be allowed and paid. Within 10 days after the presentation of a petition signed and acknowledged in the same manner as are deeds entitled to be recorded by 200 residents of such county, it shall be the duty of the county judge to convene the said board at the most suitable and convenient place or otherwise arrange for concerted action for the appointment of four resident taxpayers in any such county, who, with the chairman of the board of supervisors and one member, to be appointed by the State commissioner of health, as provided by sections 401 and 402 of this article, shall constitute a board of commissioners to be known as "The (here shall be inserted the name of the county in and for which the commissioners are to be appointed) county extermination commission."

SEC. 401. *Chairman of board of supervisors ex officio member.*—The chairman of the board of supervisors of each county in and for which a commission is appointed shall be a member ex officio of such commission, and shall serve

without compensation, except that the necessary expenses actually incurred by his attendance upon meetings of such commission shall be allowed and paid. He shall have equal powers, privileges, and duties with the other members of such commission.

SEC. 402. *The State commissioner of health to appoint one member of such commission.*—The State commissioner of health shall appoint one member of such commission who shall have equal powers, privileges, and duties with the other members of such commission. Such member shall be a resident of the county for which such commissioners are appointed, and he shall in addition to his powers, duties, and privileges conferred, represent the State commissioner of health in all matters as the State commissioner of health may direct.

SEC. 403. *Members to serve without compensation.*—The members of such commission shall serve without compensation, except that the necessary expenses of each commissioner for actual attendance at meetings of such commission shall be allowed and paid. No person employed by such commission shall be a member thereof.

SEC. 404. *Commissions; terms of office.*—The commissioners first appointed by the county board in any district under the provisions of this article shall hold office respectively for the term of one, two, three, and four years. The term of the member appointed by the State commissioner of health shall be four years. All such commissioners after the first appointment shall be appointed for the full term of four years. Vacancies in such commission, occurring by resignation or otherwise, shall be filled by the county board in the manner provided in section 400, except any vacancy caused by resignation or otherwise of the member appointed by the State commissioner of health, which shall be filled by the State commissioner of health in the manner provided in section 402 of this article, and the persons so appointed to fill such vacancies shall be appointed for the unexpired term only.

SEC. 405. *Official oath; officers.*—Before entering upon the duties of his office each commissioner shall take and subscribe an oath or affirmation before the clerk of the county in which is situated the district in and for which he is appointed to faithfully and impartially perform the duties of his office, which oath or affirmation shall be filed with such clerk. Every such commission shall annually choose from among its members a president and treasurer, who shall serve without pay, and they shall respectively perform the duties ordinarily incidental to such offices.

SEC. 406. *Commission a body corporate and politic; powers.*—From and after the appointment, qualification, and organization of such commissioners, such mosquito extermination commission shall become and be a body corporate and politic, under the name given in such petition, and by such name and style may sue, be sued, execute contracts, have a corporate seal, and shall have all powers herein conferred upon it within the counties wherein it is appointed.

SEC. 407. *Secretary of commission; salary.*—The commission may appoint a secretary, whose compensation shall be fixed by such commission; the salary of such secretary shall not exceed, however, the sum of \$1,800 per annum.

SEC. 408. *Clerks and assistants.*—Said commission may, with the approval of the board of supervisors of the county, appoint and employ such clerks, assistants, inspectors, and day laborers as may be necessary to carry out the provisions of this article. The compensation of such clerks and assistants shall be fixed by the board of supervisors of the county.

SEC. 409. *Duties of clerks and assistants.*—The commission shall prescribe the duties and hours of employment of clerks and assistants and make all rules and

regulations respecting the same. The commission shall furnish them with necessary and proper facilities.

SEC. 409a. Accumulation of water a nuisance.—Any accumulation of water in which mosquitoes are breeding, or are likely to breed, is hereby declared to be a nuisance.

SEC. 410. Powers and duties of commission.—Said commission shall use every means feasible and practicable to exterminate mosquitoes of every variety found within the county for which such commission is appointed. Such commission shall have power and authority to enter without hindrance upon any or all lands within the county for the purpose of draining or oiling the same and to perform all other acts which in its opinion and judgment may be necessary and proper for the elimination of breeding places of mosquitoes of which will tend to exterminate mosquitoes of fresh water, salt water, and every other kind or variety found within such counties.

SEC. 411. Publication of notice of entry, claims, damages, and payments.—Before entering upon any such lands for such purposes as outlined under section 410 hereof, the commission shall publish each year, at least once during the year, immediately following the approval by the State commissioner of health of its plans for work during the ensuing year, as provided in this article, in at least one newspaper in every town of the county where work is to be performed and in which such a paper is published, a general description of the land, with the names of the owners thereof as shown by the last assessment rolls, if known; if the name of the owner or owners be unknown, that fact must be stated and published; and in case of a town where work is to be performed by the commission and in which no newspaper is published, individual notices shall be first sent to every owner in such town upon whose land the commission proposes to enter for said purposes, if the name of such owner be known; if unknown, such notice shall be posted in not less than five conspicuous places in such town. Any person objecting to or who is aggrieved or who claims damages due to the execution of the work of the commission shall file a protest with the commission setting forth his grievance or claim. The commission shall thereupon, and within 30 days after the filing of such protest or claim, set a day for a public hearing thereof. In all such cases the decision of the commission as to the necessity of such work shall be final. Any damage claimed by any party on account of entry work of the commission upon his property shall be determined by an action in court to be tried in the county, and the amount of any damage that may be awarded such party shall be included in the next succeeding estimate of annual requirements of the commission and shall be included in the annual tax levy as provided for in this article and be paid by the commission.

SEC. 412. Estimate of annual requirements; power and duty of State health commissioner.—Every such county commission shall, on or before the 1st day of September in each year, file with the State commissioner of health a detailed estimate of the moneys required for the ensuing year and a plan of the work to be done and the methods to be employed, together with a general description of such lands with the names of the owners thereof, as recorded by the last assessment rolls if known, if unknown that fact shall be stated, as the commission proposes to enter upon and to execute such plans and work. Such commissioner shall have the power to approve, modify, or alter such estimates, plans, and methods, and such estimates, plans, and methods finally approved by him shall be forwarded by him to the board of supervisors in the county on or before the 1st day of October following its receipt.

SEC. 413. Duties of boards of supervisors.—It shall be the duty of the board of supervisors in every county in which a commission is appointed as [sic] its annual or other meeting in the month of December of each year and on receipt of the said report from the commissioner of the State board of health, to cause to be included in the annual tax levy of such county and added to the tax roll for the succeeding year such amount of money for the use and purposes of the mosquito extermination commission, in its said county, as is approved by the State commission [sic] of health in such report: *Provided, however,* That in no one year shall the amount so raised exceed the amount hereinafter specified, to wit, in counties where the assessed valuations are not more than \$40,000,000 a sum not greater than 1 mill on every dollar of assessed valuation; in counties where the assessed valuations are in excess of \$40,000,000 a sum not greater than three-eighths of 1 mill on every dollar of assessed valuations.

SEC. 414. Disbursements by county treasurer.—The county treasurer of each county shall pay from time to time to the mosquito extermination commission, on the requisition of such commission, duly signed and approved by the president and secretary thereof, the amount of moneys so specified in the annual tax levy for the purposes and uses of such mosquito extermination commission.

SEC. 415. Annual report.—It shall be the duty of each mosquito extermination commission, on or before the 1st day of September in each year, to submit to the State commissioner of health and to the board of supervisors in each respective county comprised within a mosquito extermination district, a report setting forth the amount of moneys expended during the previous year, showing each item of expenditure, the methods employed, the work accomplished, and any other information which in its judgment may seem pertinent or which the board of supervisors may demand. Such report shall be published in at least one newspaper published in the county.

SEC. 416. Reservation of powers.—Nothing in this article shall be construed to alter, amend, modify, or repeal sections 26 to 32, inclusive, of this law, or of any of the provisions of the drainage law except to the extent that the provisions of this article are inconsistent therewith.

SEC. 417. Temporary provision for 1916.—If a commission be appointed under this article before June 1, 1916, such commission shall, on or before the 1st day of July, 1916, file with the State commissioner of health, in accordance with the provisions of this article, an estimate of the moneys required for the year 1916, and a plan of the work to be done and the methods to be employed by the commission during such year. The State commissioner of health shall on or before July 15 consider such plans, methods, and estimates and approve, modify, or alter the same as provided by section 412, and forward the same to the treasurer of such county, who shall at once borrow, on the credit of such county, the amount specified in such estimate, not exceeding, however, the amount specified in section 413 of this chapter. Such amount, so borrowed, shall be a county charge and shall be included by the board of supervisors in the tax levy for the ensuing year. The money so borrowed shall be paid by the county treasurer to the mosquito extermination commission, according to the provisions of section 414 of this chapter.

SEC. 418. Obstructions; interferences.—Any person who obstructs or interferes with the entry of the commission or its employees upon land or who obstructs or interferes with, molests, or damages any of the work performed by the commission shall be guilty of a misdemeanor.

Hospitals—Care of Indigent Persons. (Ch. 483, Act May 9, 1916.)

SECTION 1. Section 30 of chapter 46 of the laws of 1909, entitled "An act in relation to the poor, constituting chapter 42 of the consolidated laws," as amended by chapter 309 of the laws of 1912, is hereby amended to read as follows:

SEC. 30. Hospital accommodations for indigent persons.—1. Any city or county, in which a hospital duly incorporated is situated, may send to and support in the same such sick and disabled indigent persons as require medical or surgical treatment, and when admitted the authorities of such city or county shall pay to such hospital such sum per week as may be agreed upon or found to be just during the period in which such person shall remain in such hospital.

2. In all counties of this State in which there are not adequate hospital accommodations for indigent persons requiring medical or surgical care and treatment, or in which no appropriations of money are made for this specific purpose, it shall be the duty of county superintendents of the poor, upon the certificate of a physician approved by the board of supervisors, or of the overseers of the poor in the several towns of such counties, upon the certificate of a physician approved by the supervisor of the town, as their jurisdiction over the several cases may require, to send all such indigent persons requiring medical or surgical care and treatment to the nearest convenient and suitable hospital, the incorporation and management of which have been approved by the State board of charities, provided transportation to such hospital can be safely accomplished. The authorities of such county or town shall pay to such hospital such reasonable sum per week for the care and treatment of such indigent persons as may be agreed upon by the authorities of the county or town and the directors of such hospital, and provision for the payment for such care and treatment shall be made in the annual budgets of such county or town.

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